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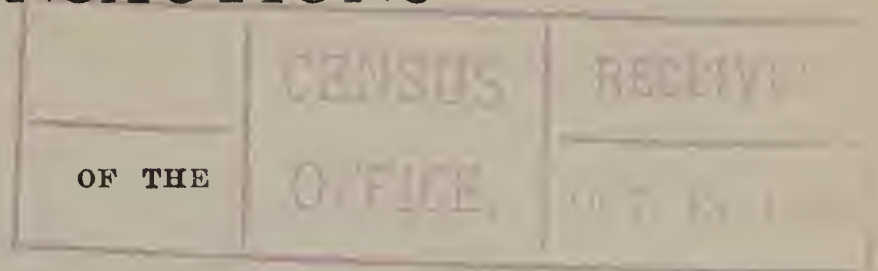
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TRANSACTIONS



WISCONSIN

STATE AGRICULTURAL SOCIETY

INCLUDING

PROCEEDINGS OF THE STATE AGRICULTURAL CONVENTION,
HELD IN FEBRUARY, 1877,

AND NUMEROUS

PRACTICAL PAPERS AND COMMUNICATIONS.

VOL. XV. 1876-7.

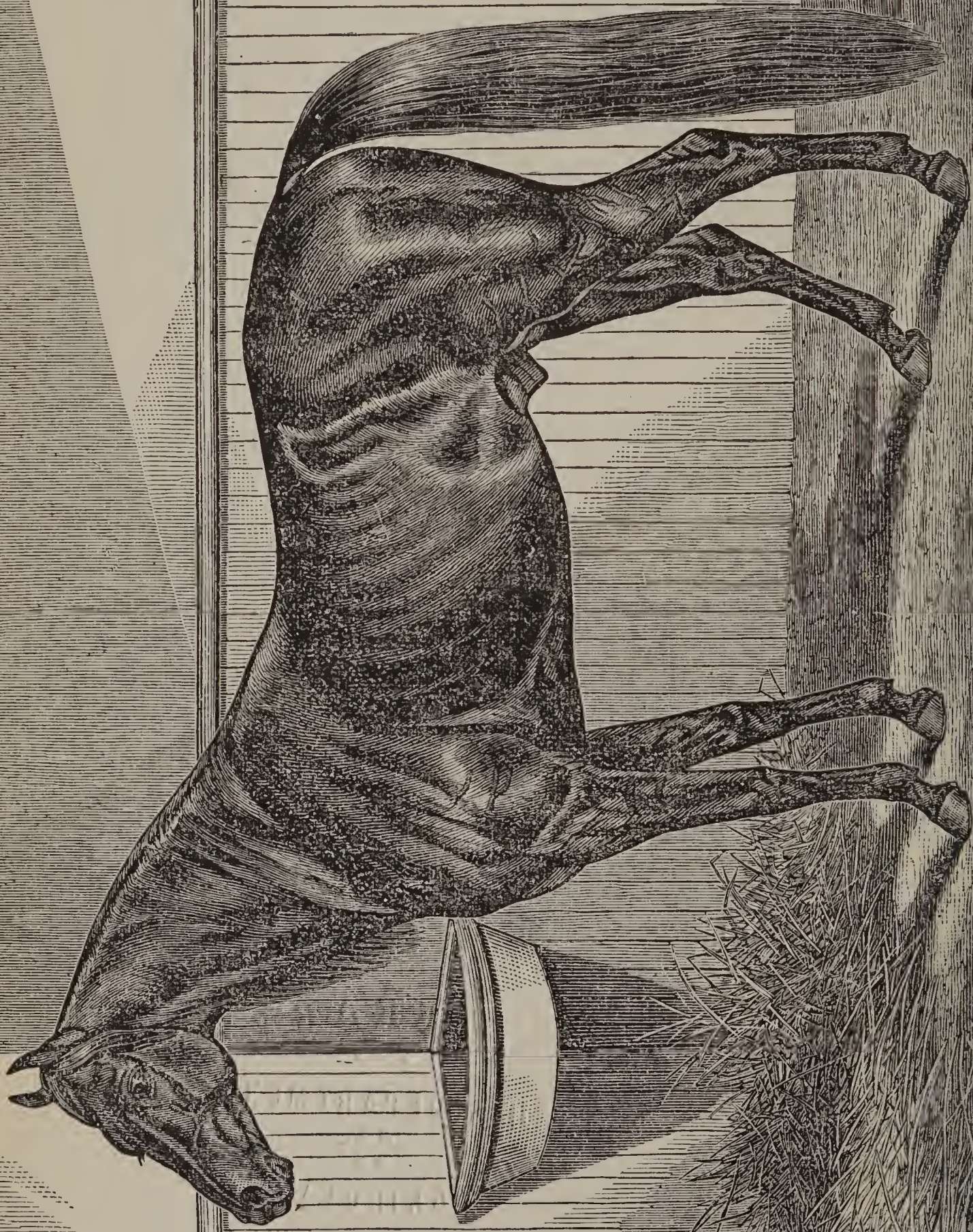
PREPARED BY

W. W. FIELD, SECRETARY.

MADISON, WIS.:

DAVID ATWOOD, PRINTER AND STEREOTYPED.

1877.



TROTTER STALLION "GOVERNOR SPRAGUE," PROPERTY OF HON. J. I. CASE, RACINE, WIS.

Wm. Stockton & Co. Engrs. N.Y.

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CONSTITUTION.

ARTICLE I.

OF THE NAME AND OBJECT OF THE SOCIETY.

This society shall be known as the "Wisconsin State Agricultural Society." Its object shall be to promote the advancement of agriculture, horticulture, and the mechanical and household arts.

ARTICLE II.

OF THE MEMBERS.

The society shall consist of life members, who shall pay, on subscribing, twenty dollars, and of honorary and corresponding members, who shall be elected by a two-thirds vote of all the members of the executive board, at any regular meeting. The presidents of county agricultural societies shall be members *ex-officio*, entitled to the same privileges as life-members, and, together, shall be known as the general committee of the society.

ARTICLE III.

OF THE OFFICERS.

The officers of the society shall consist of a president, one vice-president for each congressional district of the state, a secretary, a treasurer, and seven additional members, who shall hold their respective offices for the term of one year from the first day of January next succeeding the date of their election, and until their successors shall have been elected; and all of whom, together with the ex-president latest in office, and the president and general secretary of the Wisconsin Academy of Sciences, Arts and Letters, shall constitute the executive board.

ARTICLE IV.

OF THE POWERS AND DUTIES OF OFFICERS.

The presidents and vice-presidents shall perform such duties as are common to such officers in like associations, as may be required by the executive board.

The secretary shall keep the minutes of all meetings, and have immediate charge of the books, papers, library, and collections, and other property of the society. He shall also attend to its correspondence, and prepare and superintend the publication of the annual report of the society, required by law.

The treasurer shall keep the funds of the society and disburse the same on the order of the president, or a vice-president, countersigned by the secretary, and shall make report of all receipts and expenditures at the regular meeting of the society in December.

The executive board shall have power to make suitable by-laws to govern the action of the several members thereof. They shall have general charge of all the property and interests of the society, and make such arrangements for the holding and management of general and special exhibitions as the welfare of the society and the interests of industry shall seem to require.

The general committee shall be charged with the interests of the society in the several counties where they respectively reside, and constitute a medium of communication between the executive board and the public at large.

ARTICLE V.

OF MEETINGS AND ELECTIONS.

The annual meeting of the society for the transaction of general business shall be held in its rooms in Madison, on the first Wednesday in December,

at three o'clock P. M., in each year, and ten days' notice thereof shall be given by the secretary, in one or more papers printed in the city of Madison.

The election of officers of the society shall be held each year during and at the general exhibition, and the exact time and place of the election shall be notified by the secretary in the official list of premiums and in all the general programmes of the exhibition.

Special meetings of the society will be called by order of the executive board, on giving twenty days' notice in at least three newspapers of general circulation in the state, of the time, place, and object of such meetings.

At any and all meetings of the society, ten members shall constitute a quorum for the transaction of business, though a less number may adjourn from time to time.

ARTICLE VI.

OF AMENDMENTS.

This constitution may be amended by a vote of two-thirds of the members attending any annual meeting; all amendments having been first submitted in writing at the previous annual meeting, recorded in the minutes of the proceedings, and read by the secretary in the next succeeding meeting for the election of officers. All amendments proposed shall be subject to amendment by a majority vote at the meeting when presented, but not thereafter.

BY-LAWS.

SECTION I.

OF OFFICERS.

The officers of the society shall, *ex-officio*, fill the corresponding offices in the executive committee.

SECTION II.

OF THE DUTIES AND POWERS OF OFFICERS.

The duties of the President, in addition to those defined by the Constitution, and the By-Laws regulating the duties of the permanent committees, shall be as follows, to wit:

1. To inspect the fair grounds after they shall have been prepared for the annual exhibition by the special committee of arrangement, appointed for that purpose, and suggest such modifications or further preparations as he may deem necessary.

2. To formally open the annual fair of the society, at such time as the executive committee may prescribe, with an appropriate address.

3. As the executive head of the society, to have a general supervision and control of the entire exhibition, subject only to the authority of the executive committee.

The duties of the Secretary, more specifically defined than in the constitution, shall be as follows:

1. To make a faithful record of each meeting of the executive committee, and keep such record in a condition for the convenient reference of any member thereof, at any time; also to make a record of every order drawn on the treasurer, and delivered to parties in whose favor they were so drawn — separately entering and numbering the orders drawn to pay premiums and those to pay general expenses, and so defining them — and of all moneys due the society; in all cases holding the parties so indebted responsible therefor until they shall have presented him a certificate from the treasurer, showing that the same has been paid.

2. To open and carry on such correspondence as may be advantageous to the society or to the common cause of agricultural improvement, not only

with individual agriculturists and eminent practical and scientific men of other industrial pursuits, but also with other societies or associations whose objects are kindred to ours, whether in this country or foreign lands, and to preserve a journal of such correspondence in the archives of the society.

3. To collect and arrange for convenient examination, standard agricultural works and periodical publications, together with such models, machines and implements as may be donated to, or otherwise acquired by the society.

4. To investigate, as far as practicable, the nature of fertilizers, indigenous and cultivated plants, insects injurious to vegetation, etc., and to collect and preserve such specimens thereof as will illustrate the natural history and agricultural resources, condition and progress of the state.

5. To institute and collect reports therefrom, needed experiments relative to the preparation of the various soils of the state for economical culture, the cultivation of different grains, fruits, and garden vegetables, the breeding and raising of stock, etc.

6. To visit, by the advice of the executive committee, or as his own judgment may direct, the various portions of the state, and to give lectures on the science and practice of agriculture, wherever and whenever they may be deemed most necessary or desirable.

7. To co-operate with the superintendent of public instruction and the agent of the normal school board, for the introduction and use in the schools of Wisconsin, of standard works on agriculture and the other industrial arts and sciences.

8. To attend as many as possible of the industrial exhibitions of this country, particularly the county fairs of Wisconsin; to co-operate with the president and special committee of arrangements, for the judicious preparation and management of our state exhibition; and to have the sole supervision and control of the office of entry thereat.

9. To carefully prepare and superintend the publication of the annual report of the society to the governor of the state, embodying therein the proceedings of the State Agricultural Society, an abstract of the reports of the incorporated county agricultural societies of the state, and such reports, essays and addresses, or other matter of information, as may be calculated to enhance the value of said report.

Finally, it shall be his duty, not only by the means above named, but also through such other instrumentalities as he may devise, and the committee approve, to devote himself faithfully and unreservedly to the promotion of the industrial interests of the state.

It shall be the duty of the Treasurer —

1. To receive primarily and exclusively all moneys due the society, from whatever source.

2. To keep a full and faithful record of all receipts of moneys coming into his hands, and of the sources whence derived, in a book specially furnished by and belonging to the society, and to have the same open, at all reasonable times, to the inspection of any person or persons authorized by the executive committee to make such examination.

3. To likewise keep an exact record of every order by him paid; and such record must be verified by the proper vouchers, showing that the sums therein named have been by him so paid.

SECTION III.

OF MEETINGS.

The Executive Committee shall meet annually, on the day preceding the day on which the annual meeting of the society is held, on Monday preceding the first Tuesday of February, and again on the first day of the annual fair.

They shall also meet at the call of the Secretary, the President and a Vice-President of the Society concurring — and may adjourn to any stated time.

SECTION IV.

OF A QUORUM.

At any meeting of the Executive Committee, four members thereof shall constitute a quorum for the transaction of business.

SECTION V.

OF PERMANENT COMMITTEES.

There shall be two permanent committees of the Executive Committee, which shall be respectively styled the *Standing Committee* and the *Finance Committee*.

The *Standing Committee* shall consist of the President, the Secretary and the Treasurer, who shall have power in the recess of the Executive Committee to draw orders on the treasury for all necessary current incidental expenses. But the Executive Committee shall have authority, and are hereby required, to revise the proceedings or transactions of said Standing Committee, and endorse or disapprove of the same.

The *Finance Committee* shall consist of the President and Treasurer, and it shall be their duty to suggest means for increasing the revenues of the Society.

They shall also have authority to invest any portion of the funds of the Society that may from time to time be set apart, by the Executive Committee for investment, disposing of such funds upon such terms and conditions as may be prescribed by the said Executive Committee.

Each of the above named sub-committees shall be responsible for the faithful discharge of their duties to the Executive Committee, to whom an appeal may at any time be taken from their acts or decisions.

The auditing, adjusting, allowing or rejecting of all bills, claims or demands, of whatsoever nature, against the Society, and the issuing of orders upon the Treasurer for payment of the same—except for the current, incidental expenses of the Society, as by this section already provided for—shall devolve upon the Executive Committee; and it shall be the duty of said Committee to annually examine the books, papers and vouchers of the Treasurer and Secretary, and compare the same, and adjust the accounts between those officers and the Society, and to report thereon at the annual meeting in December.

SECTION VI.

OF THE ORDER OF BUSINESS.

The following order of business shall be observed at all meetings of the Executive Committee:

1. Reading the minutes of the preceding meeting.
2. Reading the minutes and reports of the Standing Committees.
3. Reading the minutes and reports of the Finance Committee.
4. Report of Auditing Committee.
5. Report from Special Committees.
6. Communications from the Secretary.
7. Communications from Members of the Committee.
8. Unfinished business.
9. Miscellaneous business.

This order of business may be suspended, however, at any time, by a vote of the majority of the members present.

SECTION VII.

OF THE FISCAL YEAR.

The fiscal year of this Society shall commence on the first Wednesday of December in each year, and all annual reports of the year previous shall be made up to that time.

SECTION VIII.

OF THE EXPIRATION OF THE TERMS OF OFFICE.

The terms of office of all the officers of this Society shall expire on the 31st day of December, in each year.

SECTION IX.

OF AMENDMENTS.

These By-Laws may be amended at any regular meeting of the Executive Committee by a vote of eight of the members thereof.

LIFE MEMBERS.

Names.	Residence.	Names.	Residence.
Adams, James	Janesville.	Bostwick, J. M.	Janesville.
Adams, Isaac.....	Cottage Grove.	Botswick, R. M....	Janesville.
Adams, L. L.....	Stoners Prairie.	Bonnell, James	Milwaukee.
Alexander, O	Milwaukee.	Bonnell, Lansing ..	Milwaukee.
Allen, J. W.....	Janesville.	Boorse, Henry.....	Granville.
Allen, W. C	Delavan.	Boyce, A. A	Lodi.
Allen, H. M	Evansville.	Boyd, R. B	Milwaukee.
Allis, Edward P	Milwaukee.	Bowen, J. B	Madison.
Angel, R. R	Janesville.	Bowman, J. M.....	Madison.
Angel, W. H... ..	Sun Prairie.	Bradley, C. T.....	Milwaukee.
Atkins, Albert R....	Milwaukee.	Braley, A. B.....	Madison.
Atwood, Charles D..	Madison.	Brazea, Benj.....	Wauwatosa.
Atwood, David	Madison.	Brichener, G. H....	Sheboygan Falls.
Atwood, Wm. T....	San Francisco.	Briggs, F.....	Buffalo, N. Y.
Atwood, R. J.....	Madison.	Brockway, E. P....	Ripon.
Armour, P. D.....	Milwaukee.	Brodhead, E. H....	Milwaukee.
Armstrong, L. G	Boscobel.	Brown, Jas. J.....	Madison.
Arnold, I. M.....	Milwaukee.	Brown, J. A.....	Milwaukee.
Aspinwall, D. M....	Farmington.	Brown, T.....	Madison.
Ayres, J. W	Kenosha.	Bruce, A. T.....	Milwaukee.
Babbitt, Clinton	Beloit.	Bryan, John... ..	Cross Plains.
Babbitt, D. H.....	Janesville.	Bryant, D. D	Madison.
Bacon, J. P.....	Westport.	Bryant, G. E	Madison.
Bacon, W. D.....	Waukesha.	Bull, Stephen.....	Racine.
Bailey, A. P... ..	Oshkosh.	Bullard, Jas	Evansville.
Bailey, M. T.....	Madison.	Bump, N. P... ..	Janesville.
Baker, Rob't H.....	Racine.	Bunker, Geo.....	Madison.
Barlass, Andrew....	Emerald Grove.	Burgess, J. M.....	Janesville.
Barlass, David.....	Emerald Grove.	Bush, Samuel.....	Milwaukee.
Barnes, George	Janesville.	Button, Henry H...	Milwaukee.
Barrows, E. S.....	Chicago.	Burnham, Miles ...	Danville.
Barry, James.....	Fitchburg.	Burnham, A., Jr...	Milwaukee.
Bates, A. C.....	Janesville.	Burnham, J. L.....	Milwaukee.
Beecroft, W. G.....	Madison.	Byrne, John A.....	Madison.
Bement, E.....	Oregon.	Casar, Wm	Janesville.
Bemis, Jervis.....	Footville.	Camp, H. H	Milwaukee.
Benedict, J. D	Bristol.	Capron, Geo.....	Madison.
Benedict, S. G	Providence, R.I.	Carleton, W. D....	Sun Prairie.
Benedict, W. G.....	Milwaukee.	Carpenter, J. A....	Waukesha.
Benson, S. W.....	Bloomfield.	Carpenter, J. E	Windsor.
Bigelow, F. G.....	Milwaukee.	Carpenter, J. H....	Madison.
Billings, Earl... ..	Madison.	Carpenter, S. D....	Madison.
Bird, I. W... ..	Jefferson.	Carr, N. B.....	Madison.
Bird, T. E.....	Madison.	Carr, Joseph S.....	Eau Claire.
Bishop, John C.....	Fond du Lac.	Carter, A. M.....	Johnstown.
Black, John.....	Milwaukee.	Carter, Guy.....	Janesville.
Blair, Franklin J...	Milwaukee.	Carver, P. S	Delavan.
Blanchard, Willard.	Windsor.	Cary, J.....	Milwaukee.
Bliss C. M	Iowa.	Case, J. I.....	Racine.

Names.	Residence.	Names.	Reidence.
Chandler, Joseph C.	Madison.	Dean, E. B.....	Madison.
Chandler, Samuel...	Milwaukee.	Dean, N. W.....	Madison.
Chapman, T. A	Milwaukee.	Dean, John S.....	Madison.
Chase, Enoch.....	Milwaukee.	De La Matyr, W. A.	Elkhorn.
Chase, H.....	Milwaukee.	Delaplaine, G. P...	Madison.
Cheney, Rufus.....	Whitewater.	DeMor, A. B.....	Milwaukee.
Children, E.....	Lancaster.	Dewey, Nelson.....	Cassville.
Chipman, A	Sun Prairie.	Dewolf, E.....	Fitchburg, Mas.
Chipman, C. R.....	Waunakee.	Devoe, A. B	McFarland.
Church, Wm. A.....	Milwaukee.	Dexter, W. W.....	Janesville.
Clapp, G. W.....	Fitchburg.	Dickerman, I. A...	Verona.
Clark, C. M.....	Whitewater.	Dickson, J. P.....	Janesville.
Clark, Lewis.....	Beloit.	Dodge, J. E	Lancaster.
Clark, Satterlee.....	Horicon.	Dodge, H. S.....	Milwaukee.
Cochrane, John.....	Waupun.	Doolittle, W. J.....	Janesville.
Cogswell, A. W.....	Brookfield.	Doris, John	Milwaukee.
Colby, Charles.....	Janesville.	Dorn, M. M	Madison.
Coleman, W. W.....	Milwaukee.	Dousman, T. C.....	Waterville.
Colladay, Wm. M...	Stoughton.	Dow, O. P.	Palmyra.
Colton, S. B.....	Middleton.	Drakely, S.....	Madison.
Cooper, E. J.....	Mineral Point.	Drury, E. W.....	Fond du Lac.
Cornell, James.....	Oshkosh.	Dunlap, S	Burke.
Cornwell, H. H....	Verona.	Dunn, Andrew.....	Portage City.
Corrigan, John.....	Cedarburg.	Dunn, Wm	Madison.
Cottrill, J. P. C.....	Milwaukee.	Dunning, Abel.....	Madison.
Cottrill, W. H	Milwaukee.	Durkee, H.....	Kenosha.
Cottrill, C. M.....	Milwaukee.	Dutcher, J. A.....	Milwaukee.
Cory, J.....	Footville.	Dwinnell, J. B.....	Lodi.
Crampton, N. B.....	Madison.	Eaton, J. O.....	Lodi.
Crawford, E. B	Omaha, Neb.	Echlin, J. O.....	Janesville.
Crawford, J. B.....	Baraboo.	Edgerton, E. W....	Summit.
Crawl, John.....	Center.	Edmunds, F. W ..	Madison.
Crilley, John J	Milwaukee.	Elderkin, Ed.....	Elkhorn.
Crocker, Hans ...	Milwaukee.	Elliott, E.....	Lone Rock.
Crosby, J. B.....	Janesville.	Elliott, Jos. T.....	Racine.
Cross, J. B.....	Milwaukee.	Ellis, J. A.....	Chicago.
Crossett, B. F.....	Janesville.	Ellsworth, O.....	Milwaukee.
Culver, Caleb E.....	Shopiere.	Ellsworth, L.....	Milwaukee.
Cummings, Wm.....	Fitchburg.	Ellsworth, W. J....	Madison.
Curtis, L. S.....	Wauwatosa.	Elmore, A. E	Green Bay.
Curtis, F. C.....	Rocky Run.	Elmore, R P	Milwaukee.
Curtis, Seymour.....	Fitchburg.	Eldred, John E....	Milwaukee.
Curtis, D. W.....	Fort Atkinson.	Elson, Charles.....	Milwaukee.
Cutting, J. W.....	Harmony.	Emmons, N. J.....	Milwaukee.
Daggett, M. L.....	Madison.	Enos, Elihu.....	Waukesha.
Dahlman, Anthony..	Milwaukee.	Esterly, Geo. W....	Whitewater.
Dahlman, John.....	Milwaukee.	Fairbanks, E	St. Johnsb'y, Vt
Dann, Obed	Janesville.	Farwell, L. J	Chicago.
Danks, E. P.....	Stoughton.	Fenn, G. W.....	Janesville.
Daniells, W. W.....	Madison.	Ferguson, D.....	Milwaukee.
Darling, K. A.....	Fond du Lac.	Ferguson, Benj	Fox Lake.
Darwin, A. G.....	Brooklyn, N.Y.	Fernly, Jno.,	La Grange.
Daubner, Geo. H....	Brookfield Cen.	Field, Martin.....	Mukwanago.
Davidson, Adam....	Verona.	Field, W. W.....	Boscobel.
Davis, G. L.....	Milwaukee.	Fifield, L.....	Chicago.
Davis, Jno	Milwaukee.	Fifield, D. E.....	Janesville.
Davis, N. P	Pierceville.	Fifield, E. G.....	Janesville.
Davis, S. B.....	Milwaukee.	Finch, Lorin	Bradford.
Davis, W.....	Center.	Firmin, F. H	Madison.

Names.	Residence.	Names.	Residence.
Fisher, C. C.....	Center.	Guernsey, Orrin....	Janesville.
Fisher, Elijah	Newark.	Gurnee, J. D.....	Madison.
Fisher, S. W.....	Center.		
Fisher, Selh.....	Center.	Haight, J. M.....	Sacramento, Cal
Fitch, D	Madison.	Haight, Nicholas..	Madison.
Fitch, W. F.....	Madison.	Hall, Augustus....	Janesville.
Fitch, W. G.....	Milwaukee.	Hallock, Youngs...	Middleton.
Fitzgerald, R. P. ...	Milwaukee.	Hall H. P.....	Madison.
Fletcher, John.....	Springfield.	Hanchett, A. M....	Hanchetville.
Flint, J. G., Jr.....	Milwaukee.	Hancock, Brad	Marshall.
Folds, Geo. H.....	Madison.	Hanks, A. S.....	Milwaukee.
Foot, A. E.....	Kansas.	Hammond, L. M....	Janesville.
Foot, Sydney... ..	Madison.	Hammond, E. S....	Fond du Lac.
Foot, E. A.....	Milwaukee.	Harrington, N. H..	Delavan.
Fowle, Jacob	Oshkosh.	Harris, Jas....	Janesville.
Fowler, James S....	Milwaukee.	Harvey, J. W. H...	Madison.
Fox, W. H.....	Fitchburg.	Hasbrouk, W.....	Eau Claire.
Fratt, N. D.....	Racine.	Hastings, S. D.....	Madison.
Frank, A. S.....	Madison.	Hausman, Jos	Madison.
Frank, George R....	Boscobel.	Hawes, J. F.....	Madison.
Frankfurth, Wm....	Milwaukee.	Hawes, W. N.....	Verona.
Freeman, C. F.....	Milwaukee.	Hayes, A. J.....	Milwaukee.
Friedman, Ignatius..	Milwaukee.	Hazelton, Geo. C...	Boscobel.
French, Jonathan...	Madison.	Hazen, Chester	Ladoga.
Fuller, M. E.....	Madison.	Helfenstein, J. A...	Milwaukee.
Fuller, F. D.	Madison.	Hempstead, H. W..	Milwaukee.
Furlong, Thomas T.	Chicago.	Hicks, J. H.....	Oshkosh.
Furlong, John.....	Milwaukee.	Hibbard, W. D.....	Milwaukee.
		Hibbard, Wm. B...	Milwaukee.
Gammons, Warren..	Middleton.	Higbee, A. T.....	Stoughton.
Gates, D. W. C	Madison.	Hill, H. J.....	Madison.
Gaylord, Aug.....	New York City.	Hill, James H.....	Madison.
Gernon, George.....	Madison.	Hill, J. W. P.....	Windsor.
Gibbs, Chas. R.....	Whitewater.	Hill, P. B	Milwaukee.
Gilbert, Thomas	Oregon.	Hill, Robt.....	Milwaukee.
Giles, H. H.....	Madison.	Helmer, A. M.....	Milwaukee.
Gilman, Henry	Stoughton.	Hiner, W. H.....	Fond du Lac.
Gillett, R. E.....	Tomah.	Hinkley, B. R.....	Summit.
Goodenow, H. D ...	Madison.	Hobart, L. J.....	Milwaukee.
Goodrich, Ezra	Milton.	Hodge, Robt.....	Janesville.
Goodrich, G.....	Whitesville.	Hodson, C. W	Janesville.
Gould, L. D.....	Madison.	Hoefflinger, Carl...	Wausau.
Grady, F. M	Fitchburg.	Hogan, Gilbert.....	Janesville.
Graham, Alexander..	Janesville.	Hollister, R. M. ...	Janesville.
Grant, S. B.	Milwaukee.	Holmes, A. M.....	Milwaukee.
Grant, Albert.....	Milwaukee.	Holt, David	Madison.
Graves, R. A.....	Ripon.	Holton, Edward D.	Milwaukee.
Graves, S. W.....	Rutland.	Hopkins, Bedford B	Milwaukee.
Green, Anthony.....	Milwaukee.	Hopkins, James ...	Madison.
Green, Geo. G.....	Milwaukee.	Hopkins, J. C.....	Madison.
Greene, N. S.....	Milford.	Hopkins, E. C.....	Milwaukee.
Green, Samuel.....	Fitchburg.	Hoskins, J. W.....	Milwaukee.
Greenleaf, E. B.....	Milwaukee.	Hoskins, Alfred....	Janesville.
Greenman, C. H	Milton.	Houston, Peter	Cambria.
Greenman, H. D....	Milwaukee.	Hoyt, J. W.....	Madison.
Gregory, J. C.....	Madison.	Hurlbert, E.....	Oconomowoc.
Grinnell, J. G.....	Adams.	Hume, Wm.....	Oshkosh.
Groom, John.....	Madison.	Hyde, Edwin.....	Milwaukee.
Grover, E.....	Madison.		
Grubb, W. S.....	Baraboo.	Ilsley, Chas. F.....	Milwaukee.

Names.	Residence.	Names.	Residence.
Imbusch, J. H.	Milwaukee.	Lindsay, E. J.	Milwaukee.
Ingham, A. C.	New York.	Little, Thos. H.	Janesville.
Jackman, Hiram.	Chicago.	Lloyd, Lewis.	Cambria.
Jeffrey, Geo.	Smithville.	Lockwood, John.	Milwaukee.
Jenks, S. R.	Madison.	Ludington, H.	Milwaukee.
Jenkins, J. C.	Janesville.	Ludington, James.	Milwaukee.
Jerdee, L. P.	Madison.	Ludlow, A.	Monroe.
Jerdee, M. P.	Madison.	Lucy, O. K.	Columbus.
Johnston, Jno., Jr.	Madison.	Lyman, H.	Dakota.
Johnson, M. B.	Janesville.	Lynch, T. M.	Janesville.
Johnson, Joseph.	Hartland.	Lynde, W. P.	Milwaukee.
Johnson, John.	Milwaukee.		
Johnston, Hugh L.	Milwaukee.	Main, Alex. H.	Madison.
Johnston, John.	Milwaukee.	Mann, I. L.	Fitchburg.
Jones, C. H.	Sun Prairie.	Mann, J. E.	Sun Prairie.
Jones, John N.	Madison.	Mann, Henry.	Milwaukee.
Juneau, Paul.	Juneau.	Mann, Curtis.	Oconomowoc.
Janssen, E. H.	Mequon.	Macy, J. B.	Fond du Lac.
		Manwaring, Wm.	Black Earth.
Kellogg, L. F.	Madison.	Marshall, Samuel.	Milwaukee.
Kellogg, Geo. J.	Janesville.	Martin, A. C.	Ashton.
Keiwert, Emil.	Milwaukee.	Martin, C. L.	Janesville.
Kent, A. C.	Janesville.	Martin, Nathaniel.	Monroe.
Kershaw, C. J.	Milwaukee.	Martin, S. W.	Madison.
Kershaw, W. J.	Milwaukee.	Mason, George A.	Madison.
Keyes, E. W.	Madison.	Masters, E. D.	Jefferson.
Kimball, M. G.	Sheboygan.	Mathews, A. K.	Milwaukee.
Kimball, John.	Janesville.	Matteson, Clinton.	Rosendale.
Kingsly, S. P.	Springfield.	Matts, I. H. B.	Verona.
Kingston, J. T.	Necedah.	Maxson, O. F.	Waukegan.
Kiser, W. C.	Madison.	May, A. C.	Milwaukee.
Kiser, J. C.	Oregon.	Mayhew, T. J.	Milwaukee.
Klauber, Samuel.	Madison.	Mayhew, J. L.	Milwaukee.
Knight, E.	Sun Prairie.	McCarty, F. D.	Fond du Lac.
Kneeland, Moses.	Milwaukee.	McConnell, T. J.	Madison.
Kneeland, James.	Milwaukee.	McCormick, J. G.	Madison.
Knowles, Geo.	Milwaukee.	McCollough, And.	Emerald Grove.
Knapp, J. G.	Tampa, Florida	McDonald, A.	Alloa.
Koss, Rudolph.	Milwaukee.	McDougal, Geo. W.	Madison.
		McDowell, H. C.	Oconomowoc.
Ladd, M. L.	Sugar Creek.	McGeoch, P.	Milwaukee.
Lamb, F. J.	Madison.	McKenna, Martin.	Madison.
Landauer, Max.	Milwaukee.	McKenna, David.	Madison.
Lapham, I. A.	Milwaukee.	McLaren, Wm. P.	Milwaukee.
Lapham, Henry.	Summit.	McNiel, David.	Stoughton.
Larkin, B. F.	Madison.	McGregor, Alex.	Nepeuskum.
Larkin, C. H.	Milwaukee.	McPherson, J. P.	Springdale.
Larkin, Daniel.	Madison.	Merrill, Alf.	Madison.
Larkin, William.	Madison.	Merrill, S. S.	Milwaukee.
Lawrence, W. A.	Janesville.	Miller, John.	Madison.
Lawton, J. G.	Green Bay.	Mills, Simeon.	Madison.
Learned, J. M.	California.	Miltmore, Ira.	Chicago.
Leidersdorf, B.	Milwaukee.	Miner, Cyrus.	Janesville.
Leitch, W. T.	Madison.	Miner, John B.	Milwaukee.
Leitch, W. T., Jr.	Vienna.	Mitchell, Alex.	Milwaukee.
Leslie, John.	Madison.	Mitchell, J. L.	Milwaukee.
Lester, Waterman.	Janesville.	Morehouse, L. H.	Milwaukee.
Lewis, Herbert A.	Madison.	Morse, Samuel.	Milwaukee.
Lewis, John L.	Madison.	Moseley, J. E.	Madison.

Names.	Residence.	Names.	Residence.
Mosher, J. C.	Lodi.	Power, D. G.	Milwaukee.
Moxley, A. R.	Madison.	Powers, D. J.	Chicago.
Mullen, James.	Milwaukee.	Powers, W. J.	Black Earth.
Murray, George.	Racine.	Pratt E. E.	Chicago.
Nash, C. D.	Milwaukee.	Pres. St. Peter's Val.	
Nazro, John.	Milwaukee.	Farmers' Club. . . .	Springfield.
Needham, J. P.	Wauwatosa.	Pritchard, P. M. . . .	Fitchburg.
Newcomb, S. B.	Cold Spring.	Proudfit, Andrew . .	Madison.
Newton Ephriam. . . .	Oregon.		
Newton, I. S.	East Middleton.	Rawson, C. A.	Madison.
Nicholas, L. T.	Janesville.	Ray, Charles.	Milwaukee.
Norris, C. W.	Milwaukee.	Raymond, S. O.	Geneva.
Norton, J. B.	Madison.	Riordon, Charles . .	Oshkosh.
Nott, F. B.	Oregon.	Reed, Herbert.	Arena.
Nowell, W. A.	Milwaukee.	Reed, Harrison	Jack'nville, Fla.
		Ressigue, A. C.	Janesville.
Ober, R. P.	Milwaukee.	Reynolds, M.	Madison.
Ogilvie, Robert.	Madison.	Reynolds, John. . . .	Madison.
Oliver, Joseph B. . . .	Milwaukee.	Reynolds, Thomas. . .	Madison.
Olney, C. W.	La Cygne, Kan.	Reynolds, John. . . .	Kenosha.
Orr, G. H.	Verona.	Rexford, J. D.	Janesville.
Ott, Geo. V.	Madison.	Rice, E. M.	Whitewater.
		Richards, Richard. . .	Racine.
Page, H. M.	Madison.	Richardson, D.	Middleton.
Palmer, H. L.	Milwaukee.	Richardson, James. . .	Buffalo, N. Y.
Palmer, J. Y.		Richardson, R. J. . . .	Janesville.
Palmer, O. M.	Oregon.	Richardson, H.	Janesville.
Palmer Henry.	Oregon.	Richmond, Amaz'h . .	Whitewater.
Park, John W.	Vernon.	Riebsam, C. R.	Madison.
Park, Wm. J.	Madison.	Robins, J.	Vienna.
Parker, C. H.	Beloit.	Robins, J. V.	New York.
Parmley, Ira.	Center.	Roddis, R.	Milwaukee.
Parsons, P. B.	Madison.	Rodgers, Lawrence. . .	Westport.
Partridge, J. S.	Whitewater.	Roe, J. P.	Franklin.
Patten, L. F.	Janesville.	Rogers, C. H.	Milwaukee.
Patton, Jas. E.	Milwaukee.	Rogers, D. J.	Milwaukee.
Paul, Geo. H.	Milwaukee.	Rogers, J. S.	Burlington.
Payne, Wm.	Janesville.	Rogers, Anson.	Janesville.
Payne H. C.	Milwaukee.	Rogers, H. S.	Milwaukee.
Peffer, G. P.	Pewaukee.	Ross, James	Botany Bay.
Pember, R. T.	Janesville.	Rowe, Richard W. . . .	Madison.
Perkins, P. M.	Burlington.	Rowe, W. E.	Mazomanie.
Perrine, L. W.	Janesville.	Ruble, Simon.	Beloit.
Perry, B. F.	Madison.	Ruggles, J. D.	San Francisco.
Pfister, Guido	Milwaukee.	Russell, Harvey. . . .	Milwaukee.
Phelps, A. Warren. . .	Milwaukee.	Ryder, James K. . . .	Waterloo.
Pierce, C. L.	Milwaukee.		
Pilgrim, D. T.	West Granville.	Sage, E. C.	New Lisbon.
Pinney, S. U.	Madison.	Sailsbury, R. W. . . .	Fitchburg.
Pickney, B.	Fond du Lac.	Sailsbury, D. F. . . .	Fitchburg.
Plankington, John. . .	Milwaukee.	Sanderson, Edw. . . .	Milwaukee.
Plumb, J. C.	Milton.	Sanderson, R. B. . . .	Madison.
Plumb, T. D.	Madison.	Sarles, John H.	Boscobel.
Plummer, B. C.	Wausau.	Schute, Charles. . . .	Milwaukee.
Pond, Samuel A.	Albany.	Schutt, U.	Janesville.
Porter, Wm. F.	Maine.	Scolland, Frank. . . .	Madison.
Porter, Wm. H.	Marshall.	Scott, S. B.	Milwaukee.
Porter, G. E.	Eau Claire.	Seville, James	Merrimac.
Post David.	Milwaukee.	Sexton, Kellogg. . . .	Milwaukee.

Name.	Residence.	Name.	Residence.
Sexton, W. F.....	Milwaukee.	Tenney, H. A.	Madison.
Simmons, C. J.....	Monroe.	Tenney, D. K.	Chicago.
Sinclair, Jeff	Milwaukee.	Tenney, Samuel ...	Durham Hill.
Sharp, J. W.....	Iowa.	Terry, A. H.	Milwaukee.
Shaw, J. B.....	Milwaukee.	Terwilliger, Jas....	Syene.
Sheldon, A. H... ..	Janesville.	Thorson, John.....	Milwaukee.
Sheldon, D. G.....	Madison.	Tibbits, Geo. M....	Milwaukee.
Sheldon, S. L.	Madison.	Tierney, K.....	California.
Shepherd, C.	Milwaukee.	Thompson, W. H....	Chicago.
Sherman, Amaziah..	La Prairie.	Thompson, Dr. W..	Madison.
Sherman, George ...	La Prairie.	Thorp, J. G.	Eau Claire.
Sherman, J. M.	Burnett.	Todd, J. G.	Janesville.
Sherwood, J. C.	Dartford.	Tolford, J. W.	Neilsville.
Shipman, S. V.....	Chicago.	Torgerson, Lars....	Madison.
Shipman, A. C.	Sun Prairie.	Torrey, R. D.....	Oshkosh.
Skelley, Charles	Madison.	Townley, John	Moundville.
Skinner, George J...	Sioux Falls D.T	Treat, R. B.....	Chicago.
Skinner, E. W.	Turner, D. T.	Treat, George E....	Milwaukee.
Slaughter, G. H.	Middleton.	True, W. H.	Fitchburg.
Slaughter, W. B.	Middleton.	Twining, M. S.	Magnolia.
Sloan, I. C.	Janesville.	Utter, Jas.....	Oregon.
Slocum, G. A.	Chicago.	Van Brunt, W. A. .	Horicon.
Smith, Winfield....	Milwaukee.	Van Cott, Albert B.	Chicago.
Smith, Angus.....	Milwaukee.	Van Etta, Jacob...	Madison.
Smith, Adam	Burke.	Van Kirk, N.....	Milwaukee.
Smith, George B. ...	Madison.	VanNorstrand, A. H	Green Bay.
Smith, J. B.	Milwaukee.	Van Schaick, I. W.	Milwaukee.
Smith, S. W.....	Janesville.	Van Slyke, N. B...	Madison.
Smith, H. L.....	Janesville.	Vaughan, O. A.	Lodi.
Smith, M. C.....	Janesville.	Viall, Andrus... ..	Madison.
Smith, S. B.	Vernon.	Vilas, Chas. H.	Cleveland, O.
Smith, J. Maurice ..	Chicago.	Vilas, L. B.....	Madison.
Snell, H.	Madison.	Vilas, L. M.	Eau Claire.
Spaulding, William .	Janesville.	Vilas, Wm. F.	Madison.
Spaulding, Joseph ..	Janesville.	Wackerhagen, E....	Racine.
Spencer, James C. ..	Milwaukee.	Wait, J. B.	Waitsville.
Spencer, R. C.	Milwaukee.	Warren, J. H.....	Albany.
Squire, Thos. H.	Waterloo.	Warren, W. R.....	Madison.
Stannard, A. C.	Milton.	Webster, James	Danville.
Stark, Chas. A.	Milwaukee.	Webster, Martin ...	Fox Lake.
Steele, Chester.....	Milwaukee.	Webb, James A....	Janesville.
Stephenson, Isaac...	Marinette.	Welch, W.....	Madison.
Stevens, Geo. C.	Milwaukee.	Wells, Daniel L. ...	Milwaukee.
Stevens, J. T.	Madison.	Werner, John	Sauk.
Steensland, H.....	Madison.	West, Henry.....	Madison.
Stewart, C. K.	Danville.	West, S. C.	Milwaukee.
Stewart, G. H.	ColoradoSpr'sC	West, Henry M....	Milwaukee.
Stilson, Eli.....	Oshkosh.	Whaling, J. M.	Milwaukee.
St. John, J. W.....	Janesville.	Wheeler, Geo. F....	Waupun.
Stockman, John	Milton.	Wheeler, Guy.....	La Prairie.
Stone, G.	Beloit.	Wheeler, W. A.	Middleton.
Storm, Wm.	Madison.	Wheeler, L. A.....	Milwaukee.
Stowe, La Fayette...	Sun Prairie.	Wheelock, W. G....	Janesville.
Street, Richard	Waukesha.	Wheelwright, J. ...	Middleton.
Sullivan, James.....	Burke.	White, A.	Verona.
Sutherland, C.	Syene.	Whiting, W. F.	Milwaukee.
Swain, Wm. W.....	Madison.	Whitney, W. F.....	Milwaukee.
Tallman, W. H.....	Janesville.	Wicks, Thomas....	Milwaukee.
Taylor, E.	Mukwanago.	Wight, O. W.	Milwaukee.
Taylor, W. R.....	Cottage Grove.	Wightman, H.....	Black Earth.

Name.	Residence.	Name.	Residence.
Wilcox, C. T.....	Janesville.	Woolcott, E. B.....	Milwaukee.
Wilkins, A. W.....	Milwaukee.	Wooley, J. T.....	Milwaukee.
Wiley, O. S.....	Benton Harbor, Mich.	Wootton, Robert...	Madison.
Williams, C. L.....	Madison.	Worden, Ed.....	Madison.
Williams, C. H.....	Baraboo.	Worthington, B. M.	Madison.
Williams, D.....	Darien.	Worthington, D....	Chicago.
Williams, Daniel....	Madison.	Worthington, Geo..	Milwaukee.
Williams, Daniel....	Summit.	Wright, D. H.....	Madison.
Williams, G. G.....	Whitewater.	Wright, Geo.....	Mt. Horeb.
Williams, J. P.....	Janesville.	Wright, J. S.....	Emerald Grove.
Williams, Randall...	Janesville.	Wright, Josiah S..	Janesville.
Williams, S. B.....	Madison	Wylie, Geo. W.....	Elkhorn.
Williams, S. G.....	Janesville.		
Wilson, Wm.....	Westport.	Young, J. E.....	Janesville.
Wilson, Zebina.....	Palmyra.	Zwietush, Otto.....	Milwaukee.

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1876.

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<i>7th " </i>	-	J. G. THORP,	-	EAU CLAIRE.
<i>8th " </i>	-	JNO. T. KINGSTON,		NECEDAH.

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TRANSACTIONS.

ANNUAL REPORT.

HIS EXCELLENCY, HARRISON LUDINGTON,
Governor of the State of Wisconsin.

SIR:—In looking back and comparing the results in this centennial year, among those engaged in the various branches of agriculture and those of other useful avocations, we believe the farmers, as a class, have been reasonably prosperous. While the crop of wheat and of oats was a light yield and of poor quality, the corn product of the state was the largest ever raised, and of superior quality. The dairy and hog product was large, and commanded remunerative prices, so that the average farmer has, by economy and frugality, saved something above a living, with which to keep up the fertility of his soil, and make needed improvements upon the farm. While many of those engaged in trade and business enterprises have been on the verge of bankruptcy and ruin, from the general stagnation of trade interests, the prudent farmer has been happy in the consciousness that while his calling seldom brings wealth rapidly, neither does it bring bankruptcy and ruin, and is, perhaps, under wise and just laws, as certain to produce competency and happiness as other callings, if intelligently and thoughtfully conducted. The farmers of the state are turning their attention more and more each year to stock growing, and the manufacture of butter and cheese, and while the prices of these products have ruled moderately low, these interests have been more remunerative than other branches of agriculture. We are fast learning that while wheat-growing may be temporarily profitable, especially when the country is new, it is not sensible, true farming, as the soil parts

with much of its fertility in the production of the cereals, and if not fed to stock, but little is returned to restore the waste, and notwithstanding this decreased fertility, and hence decreased actual value of the land, wheat-growing in Wisconsin has resulted in small profit to the producers. We must adopt a compensating system of farming; one which shall tend to keep up the original fertility of our lands. This can only be done by growing grass, corn and other products which are readily converted into beef, pork, butter, cheese and other concentrated articles of food, which will bear shipment to the seaboard and foreign markets.

In this connection I desire to say a word to those who have been brought up upon the farm, and who are now about to choose an avocation for life. In my judgment, there never was a better time for the young man to engage in some branch of agriculture, and push it to the highest point to be attained with profit. The present and future of agriculture demand that you stick to the farm, and not let any visionary schemes for the rapid accumulation of wealth, in speculative or other channels, dazzle or deceive you. A few will amass greater fortunes by some fortunate venture, and may win more honor and distinction in some other avenue of labor, but I can see nothing specially inviting or hopeful in the leading trades, business or professions, most of which are filled to that extent that those engaged therein are poorly paid. Agriculture wants the education, culture, energy, physical strength and skill of our young men, and young women too, to make it pay, and give it a place in the front rank of the callings it so justly deserves. No occupation is more ancient or more honorable, and under just laws, with education to guide and energy to push, none, all things considered, will pay better. How little one knows of the treasures locked up in the soil, and the best methods of obtaining them. Agriculture is a broad field when viewed in all its branches, and the best talent, education and skill are demanded in its progress and development.

Agriculture also requires the active aid and co-operation of the young women of the country; and I wish here to say to them, do not despise the farm. In some respects there is more life and pleasure in the city than in the country, but city life often brings weakness and effeminacy to the young, while country life brings strength and self-reliance, and is compatible with the highest intelligence and

culture. Do not consider that you are engaged in menial service, if you even assist in the labor of the farm or garden which you are physically able to perform, if your labor is not required in household duties. The service you can thus render may remove a mortgage from the homestead, instead of placing a second one upon it by earning nothing and spending the season at some fashionable watering place or summer resort. It is said to be very fashionable among ladies now-a-days to have a brown tint to their complexion in autumn, showing that they have spent the season at the seaside or mountain resort, and of course have secured this color by the expenditure of hundreds of dollars. This certainly is pleasant, and I find no fault with it, if it can be afforded. This money can all be saved, however, and I will guaranty the requisite tint given, by labor upon the farm or in the garden, and additional health and strength secured; and added to all this, should be the rich consciousness that they have, by labor, contributed something to the general welfare. Why is it that our foreign-born citizens seldom lose their farms, if mortgaged for one-third to one-half their value, while our native-born do not, in a majority of cases, meet such liabilities? It is because the family of the former class, girls as well as boys, do all they can to earn a living and to keep that monster, interest—at the rate paid in this country—from taking their possessions.

Lessons of economy, frugality and industry must be taught our young women as well as our young men, and a desire inculcated to do what they can, do something for the common support of the family, and that labor in all the varied channels of legitimate industry is not only respectable, honorable and highly commendable, but is a blessing to themselves, and the great foundation element of progressive society.

The prosperity of a state or nation is governed, to a great extent, upon the success attending the producers of those things which benefit mankind. They who, by hard study, solve a problem or establish a principle, the object of which is to secure happiness and prosperity to the people, are producers and aids to society. The merchant, mechanic, manufacturer, and all who use brain and muscle in contributing to the legitimate wants of society, are in the true sense as much producers of wealth as he who produces products from the soil or ore from the mine. The farmer, however,

the educated, scientific farmer, one really worthy of the name; one who studies the laws which govern the growth of plants and animals, and who wisely connects this knowledge with muscular effort, producing food for the world — he is a producer in the highest and best sense. “He is to the people what fuel is to the engine.” His is the calling or pursuit which must be strong and healthful, for out of his profits are the means to come for the support of all other activities. While it is true that many of the leading industries and professions are largely dependent each upon the other, and are all aids to society, it cannot be denied that of all others, agriculture should stand at the head and command the respect which its importance demands. Though only about one-sixth of the population of our country are farmers in the strict sense, yet those engaged in useful production, and whose interests are intimately connected with agriculture, are a large majority of the American people, and yet how small a proportion of these producing classes hold positions of power and influence, and help to shape the policy and destiny of this great government. Those who create the wealth of the world have little to do in the enactment of laws governing production and the profits which should flow therefrom.

“More than one-third of all the real and personal property of the entire country is invested in farms, farm implements and live stock; and yet it is a rare thing to find this immense and most important interest represented in Washington. While we do not assume or believe that any man or men, or any branch of industry or profession have any patent or incontrovertible title to the important position of law-making, we do claim that less lawyers and more farmers would result in less wind and more work, less partisan strife and more practical and speedy legislation. If we have royalty among us, the blood courses in the veins of the intelligent, reading farmer, and in no way can he command the respect of others more than by manifesting a knowledge of the importance of his profession to the world, and, as individuals, as well as societies, demand representation in legislative affairs, that the claims of his calling may receive its due recognition.

“Manufacturers, lawyers and bankers, assembled to enact laws, pass lightly over the importance of developing the resources of the soil, forgetting that from that source comes the material for the factories and transportation companies. At such a time we need

earnest, honest, practical, clear-headed, thorough-going farmers to hold fallacies up to the light and send sunshine into the dark ways of selfish legislation."

Nearly one-half of the entire property of the country is invested in farms and stock and the machinery and tools used in successfully operating this land, and yet this vast property is almost wholly represented in the nation by those engaged in the professions, those who, from their early education and habits of life, do not comprehend the wants, wishes and needs of this producing population, and who cannot be in active sympathy with this wealth-producing people they are elected to legislate for, and who are enacting laws for the protection of class interests, and in direct conflict with the highest good of the producers. Representation in the state and nation should be in proportion to the property and interests to be represented; then all will be fairly represented and protected, and prosperity and the best good of all the people be attained. Intelligent, independent voters can accomplish this result. All other remedies will be futile.

LABOR AND CAPITAL.—These are the elements which furnish food, clothing and shelter to every human being, and add to the private individual's, and hence to the nation's, wealth. The great question for political economists, legislators and statesmen to solve is, how these important elements shall be harmonized and brought upon a greater equality than now exists. Labor can never be as powerful as capital, for the reason that its necessities for food and other requirements must be met at once, while capital can wait for profitable results in the future without fear of starvation, want of clothing or shelter. It cannot truthfully be denied that the legislation of our country, both state and national, has tended to protect and strengthen capital, and hence weaken and prostrate labor. The reverse of this should be the rule, for from the nature of these elements, labor is the weaker, and should therefore have the fostering, protecting care of the government.

These elements cannot be separated, for in this age of telegraphs, railways and vast concentrated capital in all the varied enterprises of the world, either is practically powerless without the other. One hundred years ago, these great wealth-producing factors were

not so closely interwoven as to-day, and labor then, as compared to the present, could be more separate and independent. You cannot sunder the ties now binding them together, without the most fatal results to all branches of trade and commerce. Capital could endure the separation with little immediate danger, while labor must exchange its force for food and other necessities now and every day. I have ever believed, and the more I observe and investigate the question the firmer are my convictions, that capital is arbitrary and oppressive to labor; that it is taking an unjust share of the profits of the partnership of these forces and factors of wealth, and that our laws discriminate in favor of capital, when the reverse should be true, as the weaker element needs support to give fair and honest competition. One of the first and highest duties of a government is, to protect all her citizens in their just rights, and, so far as possible, create contentment, and hence happiness, throughout her domain. This contentment and happiness—the strength of a republic—cannot be created while labor is poorly paid, eking out a bare subsistence, and while capital at the same time is making handsome profits from this labor, upon investments. Peace, contentment and quietude can never follow injustice. I wish here to repeat what I have said in substance in former volumes, that labor, after deducting a good living for those who perform it, should have a large proportion of the surplus products as its share, as it assumes all the risks incident to the growth or production of articles of utility in all the varied channels of industry, while capital assumes few or no risks, being always well secured before it enters into partnership with labor. Interest on money is the underlying principle of this whole subject, and until interest shall be reduced so as to bear a just comparison with the profits of legitimate, productive industry, capital will continue to increase in the hands of the few to the detriment of the many. The remedy is with the people, in the enactment of wise and wholesome laws, such as shall be just towards labor and just towards capital, and in industry and economy in every industrial department. These would bring contentment and happiness to the people, and strength and permanency to the government.

An epoch in the history of this Republic has come and gone, and we now step upon the platform of the second century. The histo-

rian will give us a faithful record of the country's progress in industry and in the arts and sciences. The wonderful advancement made in those departments has been shown at the great Centennial Exposition at Philadelphia. The large proportion of the improved machinery and tools for agricultural and manufacturing purposes have been made within the memory of those now on the shady side of fifty years of age, and they who well remember the sickle, scythe and flail, the clumsy, awkward plows, harrows, forks and other tools with which the labor of the farm was performed, can have a clear conception of the progress made, and can appreciate the ease and cheapness with which the crop of to-day is raised, as compared with those times.

No class of people who visited the Centennial Exposition were more interested, and gained more substantial advantages from the same, than the intelligent tillers of the soil. The business of farming calls for less travel from home than many pursuits, hence their curiosity to see and learn is greater, and their intellects are sharpened and quickened by contact with representative men and minds of other avocations, and what they see and hear is treasured up for their own use and enjoyment, and that it may be of benefit to those around them. This exhibition to the agriculturist was almost equal to a visit to foreign countries, which few farmers have the time or means to enjoy. Here one could see the products of other nations and climes, and compare them with our own; could witness the articles now manufactured by machinery, and compare them with articles similar, but manufactured by the old hand process a century or less ago, and observe what a change has been wrought. Many articles and products once within the reach of only the wealthy, and considered as luxuries, have now become absolute necessities in the household of every substantial, well to do farmer. It was well also for the farmer to learn, as he did, at this International gathering, "that we live not by bread alone, but by the more æsthetical productions as well." That while food, clothing and shelter are the leading essentials, a cultivated taste for the beautiful in nature and art, and a mind stored with valuable knowledge, contribute to make life sweeter and richer, and tend to a higher and better civilization. I could not help looking with pride upon the products of agricultural hall and those in the manufacturers' department, including the improved machinery, which mate-

rially lessens labor, and hence enables the farmer to furnish cheaper food for the people. As I looked upon the choicest products of the soil, including cereals, butter, cheese and blooded stock, I felt that the calling of the farmer was not behind others in benefits and blessings bestowed upon the world, and that agriculture in its varied branches was keeping pace with other leading industries of the nations of the earth. The opportunities for comparison are what make these exhibitions of such value. They are to the nations, what state and county fairs are to their respective peoples. A spirit of rivalry is produced, and improved results follow, not only in the industries, but in the educational, art and other departments as well, supplying mental food in abundance and of choicer quality, as the intellectual appetite is increased. The farmer is no longer isolated from other activities of life. Steam and electricity have brought him into close relations with all other avocations, and he must see to it that his mental powers increase in strength, so that in this changed condition he shall be able to compete successfully with other trade and business classes.

Agriculture is the great leading, abiding resource of the country, and I believe has received an impetus from the great Exhibition, second to no other interest, and as has been well said, "we believe that the enduring triumph of the century is to be written down in history as that of agriculture."

The State showing at this Centennial Exhibition was highly creditable to Wisconsin, to the State Board of Centennial Managers, and the different associations and individuals having the management of the same.

The leading exhibits were:

1. MINERAL DEPARTMENT —

Mineral specimens, 957.

Pre-historic stone implements, 2,932.

Copper implements, 154.

2. AGRICULTURAL DEPARTMENT —

About three hundred specimens of cereals, grasses and other field and garden seeds.

Valuable woods of the state.

Agricultural map of the state, showing the lines of railway, principal rivers, cities, towns and villages, including the pop-

ulation, native and foreign born, by counties, acreage in crops in 1875, and other matters of state interest.

Wisconsin State Horticultural Society 320 varieties of apples and choice specimens of pears, plums, grapes, cranberries and other fruits.

State Dairymen's Association — fine exhibit of butter and cheese in June and October.

State Sheep Breeders' Association — good exhibition of fine woolled sheep and choice samples of wool.

"Old Abe," the War Eagle.

3. EDUCATIONAL DEPARTMENT —

Map of the state, giving location and grade of each school house; views of the State University, Normal and other high schools.

Students' work in State University.

Normal and public schools.

State department reports, essays, addresses and miscellaneous papers.

4. WOMEN'S PAVILION —

The Memorial Shrine — a beautiful ebony case, with landscape scenery on the panels, and upon a heavy silver plate was engraved, "Women of Wisconsin," with the motto, "Love and Faith in each other, in our country and our God."

The Cabinet — a depository of literary works of the Women of Wisconsin.

The Centennial Medallion — Beloit College seal design, a beautiful piece of needle work wrought upon satin with silk and velvet.

Centennial Poem — the Four Lakes of Madison, by Henry W. Longfellow; a case mounted in book form on carved ebony, and with beautifully illustrated letters.

Numerous choice paintings, prominent among which were, "Calla Lillies," "Geneva Lake," "Lake Winnebago," "Moses in the Bulrushes," "Fruit" and "Fish."

5. ART GALLERY —

The most noticeable works of art were, "The West," a marble statue, full size, by Miss Vinnie Ream, a native of Madison;

and a "Bust" and "Medallion," by Miss Wilhelmina Filians, of Madison; and paintings of Third and Fourth Lakes at Madison, by Thomas Moran.

6. WISCONSIN HOME —

Paintings of Joseph Crele, who died at Portage City, aged 141 years; Ma-she-me-ha, who was said to be 160 years of age at the time of her death.

The first house in Madison.

"Old Abe," the War Eagle, and other interesting pictures.

Numerous medals and diplomas were received, both upon state and private exhibits, and these honors were worthily bestowed and highly appreciated.

The order of the Patrons of Husbandry has for its object the education of the farming classes, and the encouragement and protection of their interests. To accomplish this result, many things are essential. Among them are: 1st. The advantages of the cash over the credit system. This is of the highest importance, as the ruinous rates of interest paid and the enormous profits demanded under the credit system take all the income from the most successful branch of agriculture. 2d. Another vital power of the order is in education and co-operation; holding conventions and meetings of farmers, where papers are read and discussions had upon those subjects which directly benefit them. These gatherings tend to expand the ideas of farmers, and the theory and practice of farming are here brought together and a more scientific system of agriculture is evolved. "Knowledge is power" applies with equal force to farming as to other pursuits. There are those, even in this Centennial year, who ridicule the idea of book or scientific farming, not seeming to realize the fact that scientific agriculture is simply knowing the principles which underlie and are the foundation of their business. The progressive farmer, however, is not satisfied that he has produced an abundant harvest, or been successful in any special branch of his work until he knows why such result was attained. "The best methods and processes" of obtaining the largest returns from the soil with the least expense, and maintaining the original fertility or making it still more productive, is scientific farming. This great primary industry cannot keep pace

with other vocations, except it takes advantage of practical and scientific knowledge, and disseminates their teachings among the masses. They who till the soil and work the mine are laying the foundation upon which all other avocations must build, and the greater the profits arising from these primary pursuits, the broader and more substantial will be that foundation. Prof. G. C. Swallow, Dean of the Agricultural College of Missouri, gives some sensible advice to agriculturists, a few pertinent sentences, of which I here quote:

“If the farmers of the country are ever to realize the objects sought by the patrons of husbandry, they must give their children more practical education, more thorough knowledge of the sciences on which their labors rest, and a more accurate understanding of the studies which fit them for public life. These colleges were founded to meet this want, and elevate the profession.

“If the farmer would make his son a faithful laborer, give him an education that will fit him for it, and make his work honorable, in his own opinion at least. If he would make his son a skillful cultivator, let him learn the reasons for culture and the sciences upon which it is based, and the mechanics which make it easy. If the farmer would make his son a rich harvester, let him study the sciences by which large, cheap crops are made. If the farmer would make his son a successful and influential husbandman, let him study those practical truths about farming which come from the experience of all the farmers from Adam to Harris.

“The Agricultural Colleges are the husbandman’s colleges, and he should patronize them. If they do not suit him, he should make them suit him, for ‘they are his to make and his to break.’ If the patrons would remedy the defects of the body politic, let them educate their sons to be good farmers, and not to be professional men, merchants or speculators. Give the tastes for the country, and not for the city. If they believe it necessary to combine for the protection of their interests, they must feel it necessary to strengthen their own cause rather than that of their opponents. Every well educated young man you keep on the farm gives the good cause the very best aid for life, and every man you send to the city gives the same aid to the opposing forces.

“Is it too much to say that he is not a good patron who gives his sons to other professions?

“ If the schools are overshadowed, if they are absorbed, if their funds are appropriated to other uses, if their students are made to occupy an inferior position, if they do not teach the subjects most useful to farmers, if they do not diffuse a taste of superior culture, if they do not make farming more honorable and more profitable, if they do not aid the patrons in every way, it will be owing to the neglect of those who have claimed to be and who ought to be their best friends.”

In one of our exchanges from the east, I recently read that several hundred farms in New England had been deserted the last year; that their owners could not obtain a living upon them, and hence of course could not sell them. This condition of things is not surprising when we consider that these lands have gradually been robbed of soil elements of fertility for a hundred years or more, with but a small per cent. of these elements returned to the soil as compensation. The wonder is that this exhaustion has been so slow, and that these farms have supported their owners thus long under their shiftless, exhaustive system, and with a soil not deep or rich in its natural condition. Let the farmers of Wisconsin and other western states heed the lessons these exhausted farms and deserted homes of the older states teach. Do not flatter yourselves that because the soil of the west is deep, rich and fertile, that it cannot be exhausted. It is only a matter of a little more time than New England has taken to exhaust her soil of plant food, before we shall be in a like condition, unless we keep up the fertility of our lands by returning each year fertilizers equivalent to that taken up by the crops grown. We all know better than we do. We know that we cannot produce cereals, pork, beef and other food, and send them to our cities and to foreign countries for consumption without taking plant food from the soil in large quantities, and unless we here apply some law of compensation, gradually the fertility will be removed until nonpaying crops will be the result. Nature does all she can for us by returning to the earth in rain, snow and dew, the ammonia and other plant food which escapes from water closets, yards and out buildings, but oftentimes not until after such gases have been taken into the lungs of the people, poisoning their systems and producing fevers and death. The

waste of all our towns and cities, where so much food is consumed by man and beast, should be utilized, and in some form returned to the soil as plant food, as it contains all the elements of plant growth. Our large cities would find it to their advantage as a sanitary measure, to have their waste, both liquid and solid, gathered and manufactured into a concentrated fertilizer and sold to the farmer at cost. If laws were enacted compelling every inhabitant of a village or city to use absorbents for all this waste, and to have it removed often to the farm or fertilizer manufactory, the health of our people would be vastly improved, and the fertility of our soil greatly increased. Feed your crops as you do your stock, with an abundance of natural food, and they will repay you with a rich and abundant harvest. This truism will apply with equal force to Wisconsin as to New England.

Is education an inducement for our young men to engage in farming? It is claimed by those who have given this subject thought and investigation, that the education acquired at our colleges and higher seminaries of learning tends to draw the graduates of such institutions from the farm, and into the cities and towns; thus weakening the rural industries, and strengthening corporations and co-operative trade and business professions. Ignorance is not one of the essential qualifications of success in any avocation, and in this age of sharp competition, knowledge, both scientific and practical, is quite as important in agriculture as in any other branch or field of labor. What are the prospects, however, of getting the young man to engage in farming when he graduates from one of these educational institutions? Experience shows us that it is not flattering. Even those who graduate from our agricultural colleges seldom engage in agriculture as a business or profession. Other avocations are educating and training young men for certain specialties: law, divinity, medicine, trade and business of various kinds; each and all have their schools, where are taught the principles which underlie their calling, and where they are specially educated for a certain branch of life-work, and they usually enter upon and pursue it with success. They are usually the leading minds in their business, simply from the knowledge they possess above the average worker in the same profession. Knowledge of agriculture, ob-

tained in the schools, and by observation and practice, ought to be used in advancing this leading industry. Agriculture will never take rank in influence and power in the state or nation, until educated, energetic business men in greater numbers engage in it. From the school to the farm should be the rule, equally as from the school to other professions. I believe it is conceded that originally schools and colleges were not established for the education of the common people, those who till the soil or perform manual labor. Education, aristocracy and wealth was the rule in the old country, and not the education of the masses. One great cause of so many of our young men seeking trades and professions is, that this silly notion which has been handed down through the ages to us, and which obtains largely to-day is, that in agriculture they must apply their knowledge by practical work; by doing something; actually performing labor with their hands. That physical labor upon the farm is degrading, and belongs to what are termed the lower or uneducated classes of society. This foolish and silly idea will continue to attach to the farming classes, until more of the educated men of our country dispel it by the elevation of the agricultural classes to equal influence and power with other callings, and this can only be done by educated men devoting their lives to agriculture, and not making it secondary to other branches of business. Lawyers and divines have been raised to the ranks of the nobility in Europe for great eminence in their professions; but who ever heard of a farmer, manufacturer or tradesman being honored by such distinction, notwithstanding the benefits the latter have conferred upon mankind may have been much greater than the former. Knowledge means power, power means influence, and influence means recognition and respect. If a monopoly of these commanding elements is held by what are termed the professions, they will lead and control, while if these powers are held by the industries in proportion to their numbers and the benefits they confer upon society, then blessings, honors and benefits will result to such classes.

From the census of 1870, it appears that more than one-half of our population above ten years of age are engaged in the various

branches of agricultural industry, and that this number is relatively decreasing. It is no doubt true that with our increased facilities for doing the work upon the farm, a less number in proportion to the whole population can produce the necessary food for the consumption of all. In the true sense, the manufacturer of farm tools and machinery, in so far as he has increased the facilities for production, is a farmer or producer of food; and yet he is classed as a manufacturer, and the same is true of other departments of labor, the products of which aid the farmer in more successfully conducting his business.

The thought suggests itself, whether we have too many farmers, or too many engaged in other legitimate branches of trade and industry. Whether there is more food and articles of utility produced than the public can use or consume, and whether there has been a margin of profit on such production. If the farmer has produced wheat, corn, beef, pork and other articles of food in great abundance, and yet at a reasonable profit on his investment, he has not grown too much; the more the better under those circumstances, both for himself and those who purchase his surplus. The same is true of all other articles produced. There is never too much produced, if a little profit can be realized above actual cost. One great trouble with the west is not that *too much* food is produced, but that *too little* is consumed at home. Wisconsin farms are being shipped east by piecemeal, and given in exchange for articles produced there which we ought to manufacture at home. Articles of every kind for the farm, factory, shop or household, can be manufactured with a better margin of profit the nearer the producer and consumer can be brought together, and the wealth of the state correspondingly increased.

I wish here to impress upon all engaged in any of the leading branches of industry of the state, not to be discouraged because your profits have been small the last year, or perchance you have run a little behind. Do not think there are too many engaged in your branch of work, and that you will try some other, and to you, untried field of labor. We know our own business, and hence can see the dark as well as the light side, while if we look upon the business of another, we can see only the bright side, or his success, and hence desire to change. Many a merchant or business man desires to be a farmer as he sees the latter drive in his Short Horn

steers and Poland China or Berkshire pigs to market and pocket the proceeds, while the farmer often says, when tired from a hard day's labor in the harvest field, and sees the former ride by in his carriage with his family, I wish I was a merchant, banker, or pursuing some profession other than farming. In most of such cases, if they should change their business, each taking the other's, both would become bankrupt, where before they had been reasonably thrifty and prosperous. Stick to the business you understand, and if from its being crowded your profits are small, remember if you step out of this, you will likely enter others equally full, and with the chances against you, from a want of knowledge of the business. Under just laws, wisely directed industry, with frugality in any department of legitimate industry, will almost invariably be crowned with success.

The liberal appropriations made by the state in 1876 and 1877, for the propagation and distribution of food fishes, have been wisely expended by the commissioners, and has placed this new food producing industry of the state upon a substantial foundation. The waters of Wisconsin are so extensive and so pure, that when fully stocked with food fishes adapted to them, the amount of food which will be produced can hardly be estimated. This too, with little or no expense in cultivation, as compared to the production of soil crops. The water, once planted, needs but little attention until the harvest, when the product can be gathered, and which in nutriment will exceed the land, acre for acre. The water, when once well planted, needs no more seed for centuries; no tilling of the element required, and with a prospect of a more uniform crop than from the soil, as drawbacks in the shape of destructive agencies are small compared with the soil products. Commissioner Baird says in his recent report relative to the importance of this industry, that "China, with its enormous population, greater to the square mile than any other part of the world, derives the larger portion of its animal food from the interior waters of the empire, the methods of fish cultivation there being conducted in a very efficient manner, and every cubic yard of pond and stream thoroughly utilized." The practicability of fish culture is now fully established, and few if any, of the states of the Union will derive greater advantages

from a reasonable outlay of money, in this branch of farming than Wisconsin. The principal part of the report of the Fish Commissioners of the state for 1876 may be found in this volume.

While the manufacturing industry of the state has been somewhat depressed the last year, caused in part by high rates of interest paid for capital, short crops, low prices and a general want of confidence in business circles, there is a hopeful sign in the fact that manufacturing in the United States is certainly improving. Witness the fact that our manufactured goods of various kinds are fast taking the place of those formerly imported, and in many cases we are competing with manufacturers in their own markets, parties of whom we used to purchase. It is gratifying to know that we have exported fifty million dollars worth of home products the last year more than we have imported.

The machinery now used in manufacturing in this country enables us to compete with the cheap labor, but hand work of the old world.

This fact was forcibly illustrated at the centennial exhibition at Philadelphia the present year, and the address of the Swiss commissioner and member of the international jury on watches, delivered at Chaux-de Fonds, Locle and Neuchatel, on his return to the old world, applies with equal, if not greater force to many of the leading manufacturing industries of our country. His remarks produced a profound impression in Switzerland, and will be read with much interest in the United States. He said:

“For a long time America has been the principal market for our watches. To-day we must earnestly prepare to struggle with the Americans on the fields where hitherto we have been the masters. Mr. Dennison, the father of American watchmaking, traveled through the canton of Neuchatel, studying our mode of manufacturing, seeking to inform himself of everything, and carefully noting the weak points in our industry. After his return to the United States, in 1854, he founded a factory at Boston — “The Boston Watch Company.” The capital, scarcely \$100,000, was subscribed by capitalists more than by practical business men. In the beginning, the company turned out only the rough skeleton movement, and attended to the finishing; all other parts, such as trains, balances, jewels, etc., were imported from Switzerland. Little by

little, however, the factory extended its operations and produced other parts. But, as the profits were small, the capitalists abandoned it, and it failed in 1856.

“Another American, Mr. Robbins, scented a good speculation, and bought the factory and tools for \$75,000. A new company, “The American Watch Company,” was formed, with a capital of \$200,000, which was increased to \$300,000 before the war which put on foot a million of soldiers, and, as every one wanted a watch, there was great animation in the watch business. At this juncture, which might have been a lucky one for our industry, we failed to comprehend our real interests. Instead of sending good watches to the Americans, the worst trash was sent. The Americans, however, went to work on an entirely different plan. The company increased its capital and turned out a better ordinary watch than the Swiss watch. At the end of several years the American watch enjoyed a good reputation, while ours were discredited everywhere. In 1865, the capital was increased to \$750,000, and the operations of the company grew to immense proportions. The Waltham Company give employment to 900 workmen, and make about 425 movements per day. They have again increased their capital, till it amounts to \$1,500,000, besides \$300,000 as a reserve fund. This watch factory is a real power; *there is none like it in Europe*. We have seen it in all its details, and we have admired its splendid organization.

“Last May, on the eve of the exhibition, we still seemed masters of the situation. One event, however, dealt us a mortal blow. The Waltham Company announced a reduction of from 40 to 50 per cent. on prices already lower than their rivals, the reduction to date back to January 1st, 1876. It is unnecessary to tell you, gentlemen, how very detrimental this was to the Swiss watch. Still another and more important reason explains the growing prosperity of the American company. Their tools work so regularly that all parts of the watch may be interchanged by a simple order on a postal card, without necessitating the forwarding of the adjoining piece.

“The question has often been asked, can the Americans sufficiently supply the demand of their markets? Yes, they can; we are driven out of the American market. In 1860 the American companies produced only 15,000 watches. To-day they produce 250,-

000, which can be easily doubled. We sent to the United States in 1872 366,000 watches. In 1876 we shall barely send then 75,000 watches. The Americans have already begun to send their manufacture to Europe. In England they sell annually from 20,000 to 30,000 watches. The American watch commences to drive from the English market the Swiss watch, and even the English watch. The Americans began by creating a demand for their goods in the Indies and in Australia, and then — thanks to some powerful importing house — they invaded England. At Moscow and St. Petersburg they have already established important branch offices. Their aim is to drive us first out of their own country, and then to compete with us on our own soil. I sincerely confess that I personally have doubted that competition. But now I have seen — I have felt it — and I am terrified by the danger to which our industry is exposed. Besides, I am not the only one to think so. The Societe Intercantonale have sent a delegate to make inquiries, and his report perfectly agrees with mine. Up to this very day we have believed America to be dependent upon Europe. We have been mistaken. The Americans will send us their products since we cannot send them our own. Their importation is not confined to watches alone. Already America has commenced to send cotton goods to England, which hitherto monopolized that article in the markets of the world.

“Can the Americans maintain their prices? Yes, they can; for if they obtain a good profit on their superior quality of goods, they can afford to be satisfied with a smaller profit on the lower grades of watches. In America everything is made by machinery; here we make everything by hand. In Switzerland about 40,000 workmen make, on an average, each forty watches per annum. In the United States the average is about 150 watches. Therefore the machinery produces three and a half to four times more than the workmen.

“Had the Philadelphia exhibition taken place five years later, we should have been totally annihilated, without knowing whence nor how we received the terrible blow. We have believed ourselves masters of the situation, when we really have been on a volcano. And to-day we must actually struggle, if we do not want to encounter in all the markets that rival manufacture. For a long time we have hoped that the customs duties, amounting to 25 per cent.,

might be reduced. We cannot count upon it. America needs all her resources, and whether democrats or republicans be in power, we cannot hope for a reduction of import duties. We must, therefore, make up our minds to lose the American market. It has been complacently said that the Americans do not make the entire watch, but are dependent upon Switzerland for several parts of the watch. This is a mistake. The Waltham company makes the entire watch, from the first screw to the case and dial. It would even be difficult for them to use our products, so great is the regularity, so minute the precision with which their machines work.

“They arrive at the regulation of the watches, so to say, without having seen it. When the watch is given to the adjuster, the foreman delivers to him the corresponding hair-spring, and the watch is regulated. [Sensation among the audience.] Here is what I have seen, gentlemen. I asked from the director of the Waltham company a watch of the fifth grade. A large safe was opened before me; at random I took a watch out of it and fastened it to my chain. The director having asked me to let him have the watch for two or three days, so as to observe its motion, I answered, “On the contrary, I persist in wearing it just as it is to obtain an exact idea of your manufacture.” At Paris, I set my watch by a regulator on the boulevard, and on the sixth day I observed that it had varied thirty-two seconds. And this watch is of the fifth American grade; it cost seventy-five francs (movement without case). On my arrival at Locle, I showed the watch to one of our first adjusters, who asked permission to take it down — that is, to take it to pieces. I, however, wished first to observe it, and here is the result which I noted: Hanging, daily variation, $1\frac{1}{2}$ seconds; variation in different positions, from four to eight seconds; in the heated room the variation was very slight. Having thus observed it, I handed the watch over to the adjuster, who took it down. After a few days he came to me and said, word for word: “*I am completely overwhelmed; the result is incredible; one would not find one such watch among fifty thousand of our manufacture!*” This watch, gentlemen, I repeat to you, I took at hazard, out of a heap, as we say. You understand from this example that the American watch may be preferred to the Swiss. I have finished, gentlemen, and I have told you of things such as I have seen them. It remains for us to profit from this sad experience, and to improve our manufacture.”

PROCEEDINGS.

EXECUTIVE BOARD MEETINGS.

OFFICE OF THE SOCIETY,
PLANKINTON HOUSE, MILWAUKEE, SEPTEMBER 11, 1876.

As required by the by-laws of the society, the Executive Board met at 7½ P. M., in the rooms of the society, Plankinton House, Milwaukee, the use of which rooms had been tendered to the society by the accommodating proprietor, H. B. Sherman, Esq., and for which favor the executive board and society are under many obligations, and here say sincerely, thank you. Present, President Stilson, Vice Presidents Clark, Mitchell, Warren, Bryant, and Torrey, Treasurer Blair, and Messrs. Martin, Fratt, McDowell, Dean, Boyce, and Secretary Field.

President Stilson in the chair.

The president called the board to order, and stated that the by-laws required a meeting of the executive committee on "the first day of the annual fair," the object being to take such action relative to the exhibition as seemed expedient to insure the highest educational and financial success.

By the generosity of the city of Milwaukee, represented by her common council and the public-spirited citizens of the city, the grounds were again placed in condition for the exhibition, free of charge. For this liberality and courtesy, we desire to express the thanks of the society and executive board.

On account of the rainy, bad weather, it was resolved to keep the office of entry open until 9 P. M., Tuesday, the 12th, except for speed premiums. Gates to be closed on Tuesday at 8 A. M.

On motion, it was resolved to admit the First Regiment Milwaukee Militia, and the soldiers and sailors from the state, free, on Wednesday at 11 A. M.

Adjourned to Wednesday evening at 7½.

WEDNESDAY, September 13, 7½ P. M.

Board met, President Stilson in the chair.

On motion, the superintendents of departments were requested to confer with exhibitors and ascertain whether, in view of the wretched weather for the fair up to that time, they were willing to have their exhibits remain until the following Tuesday, should the board conclude to continue the fair until that time, and to report at an adjourned meeting at the president's office on the fair grounds, Thursday morning at 10 o'clock.

Adjourned to Thursday, 10 A. M.

THURSDAY, September 14, 10 A. M.

Boart met, President Stilson in the chair.

The superintendents reported that most of the exhibitors were willing their stock and articles on exhibition should remain until Tuesday of the following week, hoping for better weather, when the people could attend the fair, witness the splendid stock and other exhibits, and contribute to the funds of the society, so as to enable them to pay their premiums and other liabilities.

On motion, it was resolved that the Fair Grounds should be kept open on Sunday, but that there would be no exhibition of stock except in the stalls; and while the buildings would be open for the inspection of exhibits, the machinery in power hall would not be operated.

On motion, the trotting was postponed to Monday and Tuesday at 2 P. M. of each day.

Adjourned to Friday at 7:30 P. M.

FRIDAY, September 15, 7:30 P. M.

Board met. President Stilson in the chair.

No business of importance coming before the board, an adjournment was had to Monday at 7:30 P. M.

MONDAY, September 18, 7:30 P. M.

Board met.

President Stilson in the chair.

Vice-President Clark moved that in view of the bad weather and hence small receipts, that the president and secretary be authorized to make a loan to meet the liabilities of the society, and to mortgage any property of the society, to secure the payment of the same. Carried.

Accounts, including all indebtedness of the society, except for premiums, were audited and paid. The payment of premiums postponed until the next meeting.

Adjourned to Monday, September 25, at 2 P. M.

MONDAY, September 25, 2 P. M.

Board met.

President Stilson in the chair.

Quorum present.

On motion it was resolved to pay 50 per cent. of the premiums awarded, and the balance as soon as the society could obtain the necessary funds.

Several audited accounts and premiums were paid, when the board adjourned *sine die*.

DECEMBER MEETING.

STATE AGRICULTURAL ROOMS,
MADISON, Dec. 5, 1876.

In accordance with the by-laws, the executive committee met in the rooms of the society, December 5, 1876, at 7:30 P. M.

Quorum present.

President Stilson in the chair.

The president stated that the principal object of this meeting was to settle with the treasurer, and compare his vouchers with the stub-book and vouchers of the secretary.

The treasurer, F. J. Blair, presented his report, showing the

financial transactions of the society for the year ending December 5, 1876, and which may be found in volume 1876-77, under the head of Society meetings. A full and complete examination of the vouchers was made, and a comparison with the books and papers of the secretary showed them to be correct. The report was approved unanimously.

In the absence of the auditing committee, President Stilson and Vice-President Bryant were appointed as an auditing committee, *pro tem.* to approve of such bills as had not been before such auditing board.

On motion, the president and secretary were authorized to sell and convey the lot separated by the Chicago, Milwaukee and St. Paul Railway from the Fair grounds, and these two officers in conjunction with the treasurer were authorized to borrow one thousand dollars for the use of the society.

On motion adjourned *sine die*.

FEBRUARY MEETING.

STATE AGRICULTURAL ROOMS,
MADISON, February 5, 1877.

The executive board of the State Agricultural Society met in their rooms in the Capitol at 7:30 P. M., to revise the premium list and locate the State Fair of 1877, and for the transaction of general business. Present — President Stilson, Ex-President W. R. Taylor, Vice-Presidents Fratt, Bryant, Mitchell, Clark, Torrey, and additional members, Messrs. Martin, McDowell, Boyce, Daubner, Stevenson, Hazen, Treasurer Blair and Secretary Field.

A petition of R. Boyce and others, stock breeders of the state, was presented, relative to certain changes in the premium list, especially in the horse department. It was read and placed on file.

The premium list was taken up and numerous changes made in the exhibits, and in the premiums offered. Class one, "Thoroughbreds," was stricken out, and other classes in the horse department amended, and the premiums slightly reduced. Sweepstakes class stricken out and a sweepstake of \$25 offered in each class, for best stallion and five of his colts, at four years of age or under, shown

in harness or not, at the option of the owner. Speed class was amended as follows: 3 minute purse, \$400; \$200 to first, \$125 to second, and \$75 to third, and same for 2:50, and 2:40 and stallion races. Colt race, purse \$200; \$100 to first, \$60 to second and \$40 to third.

Adjourned to 9 A. M., Tuesday.

TUESDAY, February 6th, 9 A. M.

Board met. Quorum present.

Mr. Stickney, of the Horticultural Society, came before the board and asked such an appropriation for the horticultural premiums of 1877 as the board thought just, in view of the reduction made in other departments.

On motion, the sum of \$600 was appropriated to the Horticultural Society, to be by said society offered as premiums in the fruit and flower department, and any portion of said sum not awarded in premiums to remain in the treasury of the State Agricultural Society.

On motion, the exhibits of horses, cattle, sheep and swine, for 1877, were confined to the state, except the 2:40, 2:50 and 3 minute races.

Mr. C. H. Richards appeared before the board on behalf of Mr. Deabold who desired to purchase a lot of land of about three-fourths of an acre, separated from the Fair Grounds at Madison by the track of the Chicago, Milwaukee & St. Paul Railway, and owned by the society. On motion of Vice-President Clark, it was voted to sell such lot to Mr. Deabold for \$210, with terms of payment to be fixed by the president and secretary.

The revision of the premium list continued. Premium heretofore offered on "Devons" was stricken out, and best and 2d best exhibition substituted, with premiums of \$75 and \$50. "Milch cows" stricken out, and "Grade Ayrshires" substituted.

Adjourned to 2 P. M.

AFTERNOON SESSION.

Revision of the premium list continued. Pens of 10 ewes stricken out of the sheep classes. Sweepstakes on "Field Products" confined

to state exhibitors, and on "Garden Products" a premium was offered to professionals and non-professionals, on best exhibition. "Operative Heavy Machinery" was stricken out.

Vice-President Torrey moved that a committee of three be appointed to recommend a scale of points relative to the milking qualities of a certain breed, or of different breed of cows. This subject elicited some discussion, but no action was taken thereon.

Vice-President Clark moved that the State Fair of 1877 be fixed for September 10th to 14th, inclusive. Carried.

Vice-President Clark moved that a committee of six be appointed, to act in conjunction with the president, to locate the Fair of 1877.

The motion prevailed.

Adjourned to Wednesday at 9 A. M.

WEDNESDAY, February 7, 9 A. M.

Board met. Quorum present.

The president announced the committee on the location of the fair, as follows: Messrs. Clark, Blair, Boyce, Bryant, Martin and Fratt.

On motion, the superintendents were authorized to appoint judges for their respective departments.

Revision of the premium list continued, and classes 52, 53 and 56 were stricken out and two new classes substituted which had been carefully prepared by Mrs. N. D. Fratt and Mrs. A. H. Cutting, of Racine.

On motion, the per diem of the president, treasurer and superintendent was reduced to \$4; secretary's salary to \$1,800; assistant superintendents, \$3.50; night watchmen and police, \$2.00, and laborers, \$1.50.

On motion, the fair grounds of the society were placed under the charge of the secretary.

Vice-President Torrey moved that the \$150 for clerk hire be stricken out, and such extra service be presented and audited as other bills. Carried.

On motion, adjourned *sine die*.

SOCIETY MEETINGS — ELECTION OF OFFICERS.

CITY HALL, MILWAUKEE, September 14, 1876.

As required by the constitution of the Wisconsin State Agricultural Society, and of previous notice given by the secretary, the life members of said society convened in the city hall at 8 o'clock P. M., to elect officers for the ensuing year. President Stilson in the chair.

The president called the meeting to order, and stated that the object for which they were convened was to elect officers of the society for 1876, and such other business as might come before them in accordance with constitutional provisions.

Vice-President Clark moved that a committee be appointed by the chair for the nomination of officers, of one from the state at large and one from each congressional district.

Mr. Sanderson offered the following resolution, as a substitute:

Resolved, That the society proceed to choose a president, secretary and treasurer, by ballot; and,

Resolved, That a committee of nine be appointed by the chair to report a list of vice-presidents and members of the executive committee.

Dr. Martin moved an amendment to the substitute, that a committee of one from the state at large, and one from each congressional district be appointed or chosen to recommend officers of the society; the former to be appointed by the chair, and the latter to be chosen by the delegates present from each congressional district. Vote taken, and declared by the president carried.

Mr. Sanderson called for a division. The chair stated that he had declared the vote before a division was called for. Mr. Sanderson appealed from the decision of the chair. Vote taken, and the chair was sustained.

The amendment to the amendment, and the original motion as amended, were then adopted.

The chair appointed J. P. C. Cottrill a member of the committee from the state at large, and the delegates from each congressional district reported the names as follows:

1st district — Geo. H. Daubner.

2d district — W. T. Leitch.

3d district — J. H. Warren.

4th district — Ed. Sanderson.

5th district — W. H. Hiner.

6th district — R. D. Torrey.

7th district — No life members present.

8th district — J. T. Kingston.

During the absence of the committee, ex-Mayor Chase submitted brief remarks, in which he expressed the hope that the society would be adopted and sustained by the state. He hoped that the Cold Spring grounds would be purchased by the state, fitted up in accordance with the needs of the society, so that liberal premiums could be given, and the world invited to compete for the prizes, and enjoy its benefits without money and without price.

Vice President Bryant endorsed the views of Mr. Chase, and hoped he would be elected to the legislature the coming winter to advocate them.

President Stilson, Vice President Clark, and Secretary Field spoke of the liberality Milwaukee had heretofore extended to the society, and expressed the hope that the same spirit would be shown now, and that business men would give their employees a holiday to attend the Fair.

Hon. H. L. Palmer introduced a resolution that it is inexpedient to open the Fair Grounds on Sunday, the executive board having voted to carry the Fair over to Tuesday of the following week, in consequence of bad weather.

A brief discussion followed by R. C. Spencer, in favor of keeping the grounds open on Sunday; and by Dr. Martin, who favored the resolution of Mr. Palmer. No action was taken, as it was thought to be within the province of the executive committee to determine that question.

The committee on candidates for the various offices came in, and the chairman, Mr. Cottrill, made the following report :

For President — Eli Stilson, of Winnebago.

For Vice Presidents — First district, N. D. Fratt, of Racine; second district, Geo. E. Bryant, of Dane; third district, J. H. Warren, of Green; fourth district, John L. Mitchell, of Milwaukee; fifth district, Sat. Clark, of Dodge; sixth district, R. D. Torrey, of Win-

nebago; seventh district, J. G. Thorp, of Eau Claire; Eighth district, John T. Kingston, of Juneau.

Secretary — W. W. Field, of Grant.

Treasurer — F. J. Blair, of Milwaukee.

Additional Members of the Executive Board — C. L. Martin, of Janesville; H. C. McDowell, of Oconomowoc; A. A. Boyce, of Lodi; Geo. H. Daubner, of Brookfield; E. J. Cooper, of Mineral Point; Isaac Stevenson, of Marinette; Chester Hazen, of Ladoga.

The chairman stated that the report was unanimous, except as to secretary, and that Mr. Sanderson, a minority of one, desired him to report the name of W. A. Nowell for secretary.

On motion, the question upon the adoption of the majority report was divided, and all adopted without dissent, except as to secretary. A vote was then taken upon secretary, and W. W. Field elected.

The president then declared the officers all elected as reported by the committee.

On motion of Vice President Clark, the society adjourned *sine die*.

ANNUAL MEETING.

STATE AGRICULTURAL ROOMS,
MADISON, Dec. 6, 1876.

In accordance with the constitution of the State Agricultural Society, due notice of which had been given by the secretary, the Society met in their rooms in the Capitol, at 3 o'clock P. M.

President Stilson in the chair. Constitutional quorum present.

The president called the society to order, and stated that the object for which they were convened was the transaction of general business, as defined by the constitution.

The report of the treasurer, F. J. Blair was presented, showing the financial condition of the society for the fiscal year ending December 5, 1876, and which had been approved by the executive committee at its session, December 5, 1876.

REPORT OF THE TREASURER.

The treasurer of the Wisconsin State Agricultural Society would respectfully report to the society the financial transactions for the year ending December 5, 1876, as follows:

RECEIPTS.		
Cash on hand December 1, 1875.....	\$3,760 07	.....
Cash of state treasurer.....	2,000 00	.....
Gate fees	5,611 85	.....
Entry fees and life membership.....	1,896 00	.....
Ground rent	1,473 10	.....
Grain and manure sold.....	142 30	.....
Advertising in premium list of 1875	10 00	.....
Advertising in premium list of 1876	510 00	.....
Milwaukee Chamber of Commerce, special premium on wheat.....	50 00	.....
Plankinton & Armour, Milwaukee, special premium on swine.....	50 00	.....
Layton & Co., Milwaukee, special premium on swine.	50 00	.....
James Vick, Rochester, N. Y., special floral premium.	40 00	.....
		\$15,593 32
EXPENDITURES.		
For premiums, being less than 50 per cent. of premiums awarded	\$3,960 35	.....
Office expenses, including postage, express and freight charges.....	325 05	.....
Executive Board expenses	295 36	.....
Printing and advertising	741 39	.....
Superintendents, marshal and assistants	1,969 75	.....
Clerks	684 00	.....
Police, labor and watchmen.....	650 75	.....
Livery and omnibus hire	160 25	.....
Hay, straw and grain.....	899 44	.....
Music	175 00	.....
Engine for power hall	200 00	.....
Payment on land	1,966 50	.....
Salary of Secretary.....	1,500 00	.....
Dinner tickets	894 50	.....
Diplomas	30 00	.....
Agricultural convention.	145 74	.....
Horticultural Society.....	77 50	.....
Miscellaneous, including orders Nos. 6, 7, 19, 27, 48, 50, 62, 69, 91, 106, 108, 109, 117, 118, 161, 179, 193, 194, 198, 210, 213, 223, 224, 225, 226, 240, 256, 276, 291, 305, 341, 345, 347, 355, 366.....	824 55	.....
		\$15,500 13
Balance on hand		\$93 19

Respectfully submitted,

F. J. BLAIR,
Treasurer.

STATE AGRICULTURAL ROOMS,
MADISON, Dec. 5, 1876.

Secretary Field moved that a committee of three be appointed by the chair, and who should not be members of the executive committee, to examine the treasurer's report.

The motion was adopted and the chair appointed the following committee: Simeon Mills, John A. Byrne and John S. Dean, who submitted a report as follows:

The committee appointed to examine the accounts of the treasurer of the State Agricultural Society, respectively report that they have carefully examined the vouchers submitted with his report, and compared the same with the warrants drawn, and find the same to be correct.

Respectfully submitted,

SIMEON MILLS,
JOHN S. DEAN,
JOHN A. BYRNE.

On motion, the report was adopted without dissent.

Vice President Bryant submitted the following amendment to the constitution:

Amend article II of the constitution of the Wisconsin State Agricultural Society, entitled "Of the members" so that it shall read as follows:

"The Society shall consist of life members, who shall pay, on subscribing, twenty dollars, and of honorary and corresponding members, who shall be elected by a two-thirds vote of all the members of the executive board, at any regular meeting. The presidents and secretaries of county agricultural societies shall be members *ex-officio*, entitled to the same privileges as life members, and, together, shall be known as the general committee of the society.

On motion, the society adjourned *sine die*.

WARRANT ACCOUNT OF THE SECRETARY.

Number of Orders issued for the year ending December 5, 1876, the amount and object of each, and the name of the person to whom issued.

No.	To whom and for what issued.	Amount.
1	F. J. Blair, expense account.....	\$27 00
2	Geo. A. Bruen, balance on fair ground.....	1,966 50
3	T. C. Dousman, expense account	12 00
4	Sat. Clark, expense account.....	16 00
5	N. D. Fratt, expense account	18 75
6	B. R. Hinkley, expense as witness.....	12 00
7	Sat. Clark, expense on investigating committee.....	9 75
8	John L. Mitchell, expense account.....	10 00
9	Geo. E. Bryant, expense account	6 50
10	Eli Stilson, expense account.....	25 75
11	D. W. Curtis, expense account.....	22 50
12	A. A. Boyce, expense account.....	12 50
13	J. H. Warren, expense account.....	7 75
14	F. J. Blair, expense account	13 00
15	American Express Company, express charges	2 10
16	John Jeffers, premium.....	15 00
17	Atwood & Culver, printing.....	76 50
18	C. H. Jacobs, premium	4 00
19	Robert Monteith, diplomas	3 00
20	James McNeil, premium	4 00
21	E. W. Keyes, P. M., postage stamps	20 00
22	Democrat Company, printing.....	32 00
23	Kate Hassing, premium	4 00
24	R. W. Castleton, premium	3 00
25	W. W. Field, salary, first quarter.....	500 00
26	American Express Company, express charges.....	11 55
27	Vroman & Frank, hardware	1 50
28	E. W. Keyes, P. M., box rent.....	2 50
29	C. L. Martin, expense account.....	13 00
30	E. J. Cooper, expense account.....	22 50
31	J. T. Kingston, expense account.....	21 40
32	A. A. Boyce, expense account.....	12 00
33	Iaac Stevenson, expense account.. ..	22 00
34	R. D. Torrey, expense account	20 96
35	Sat. Clark, expense account.....	16 50
36	F. J. Blair, expense account.....	16 50
37	N. W. Dean, expense account	4 50
38	Geo. E. Bryant, expense account	4 00
39	N. D. Fratt, expense account.....	18 75
40	T. C. Dousman, expense account.....	17 00
41	H. C. McDowell, expense account.....	16 50
42	Eli Stilson, expense account.....	18 75
43	Chamberlin Manufacturing Company, die and ribbons.....	7 50
44	Geo. P. Pepper, premium.....	10 00
45	Geo. A. Mason, Horticultural Society	77 50
46	R. H. Sawyer, stenographer.....	40 00
47	Wm. Levey, premium	10 00
48	Sidney Meyers, expense account	12 00
49	W. W. Field, clerk hire	150 00
50	P. B. Parsons, board.....	8 00

Warrant Account of Secretary — continued.

No.	To whom and for what issued.	Amount.
51	Wm. Storey, premium.....	\$36 00
52	Sawyer & Weston, stenographers.....	105 74
53	E. W. Keyes, P. M., postage stamps.....	15 00
54	E. W. Keyes, P. M., box rent.....	2 50
55	American Express Company, express charges.....	4 30
56	W. W. Field, salary, second quarter.....	500 00
57	J. S. & Ira Rowell, premium.....	200 00
58	Democrat Co., printing.....	225 00
59	E. W. Keyes, P. M., wrappers.....	32 40
60	E. W. Keyes, P. M., postage stamps.....	30 00
61	Democrat Co., printing.....	7 50
62	Wm. J. Park & Co., bookbinding.....	19 50
63	United States Express Company, express charges.....	1 05
64	American Express Company, express charges.....	1 35
65	S. D. Carpenter, printing.....	1 50
66	E. W. Keyes, P. M., stamps.....	20 00
67	Academy of Science, express charges.....	1 35
68	S. D. Carpenter, printing.....	5 00
69	W. W. Field, expense account.....	39 45
70	E. W. Keyes, P. M., postals and stamps.....	50 00
71	C. H. Hamilton & Co., card board.....	21 94
72	American Express Co., express charges.....	3 15
73	Democrat Co., printing.....	3 50
74	Wisconsin Patriot, printing.....	2 00
75	E. W. Keyes, P. M., box rent.....	2 50
76	American Express Co., express charges.....	24 75
77	Sentinel Printing Co., printing.....	116 00
78	Jennie M. Field, clerk.....	14 00
79	Western Rural, advertising.....	20 00
80	Wm. Storm, clerk.....	31 50
81	Geo. W. Baxter, clerk.....	42 00
82	John Hoose, watchman.....	16 50
83	W. B. Leaf, assistant superintendent.....	38 50
84	A. A. Boyce, superintendent ..	60 00
85	Geo. H. Daubner, assistant superintendent.....	31 50
86	J. H. Balch, clerk.....	65 00
87	Thomas Higgins, assistant superintendent.....	35 00
88	C. W. Chase, assistant superintendent.....	35 00
89	A. E. Chase, assistant superintendent.....	35 00
90	Hiram Lake, assistant superintendent.....	35 00
91	Sat. Clark, expense account.....	9 00
92	Sat. Clark, superintendent.....	85 00
93	H. R. Clark, superintendent.....	50 00
94	C. L. Carr, assistant superintendent.....	35 00
95	F. Smiley, assistant superintendent.....	35 00
96	J. A. Roper, assistant superintendent.....	35 00
97	James Garvin, assistant superintendent.....	35 00
98	A. H. Downing, assistant superintendent.....	28 00
99	D. W. Curtis, superintendent.....	25 00
100	C. L. Martin, superintendent.....	45 00
101	J. W. Baker, assistant superintendent.....	31 50
102	W. Wagstaff, watchman.....	2 50
103	Isaac Adams, assistant superintendent.....	42 00
104	D. J. Clark, superintendent.....	55 00
105	W. F. Storey, advertising.....	30 00
106	Althouse, Wheeler & Co., tanks.....	20 00
107	P. V. Deuster, advertising.....	5 20

Warrant Account of the Secretary — continued.

No.	To whom and for what issued.	Amount.
108	M. Brown, cartage.....	\$1 50
109	Steele & Rolf, furniture	8 00
110	F. Zendner, watchman.....	20 00
111	P. Van Vechter, assistant superintendent.....	17 50
112	W. H. Ashard, gate attendant.....	17 50
113	Henry Gere, gate attendant.....	17 50
114	R. D. Torrey, superintendent	56 25
115	D. W. Curtis, printing.....	5 00
116	J. H. Warren, police expenses	40 00
117	R. W. Pierce & Co., lumber.....	11 50
118	A. W. Coe, sundries.....	34 09
119	H. D. Gardner, assistant superintendent.....	35 00
120	James Drew, gate attendant.....	28 00
121	L. Barrett, gate attendant	28 00
122	R. R. Fellows, gate attendant	28 00
123	Fred. Perkins, gate attendant	28 00
124	Reuben North, gate attendant	28 00
125	A. Robertson, gate attendant.....	28 00
126	Isaac Charnley, gate attendant	28 00
127	Charles Ellerson, gate attendant.....	28 00
128	James Stryker, gate attendant.....	28 00
129	H. W. Seaver, gate attendant	28 00
130	N. D. Fratt, superintendent.....	45 00
131	A. Daubner, police.....	4 00
132	T. Allen, assistant superintendent	21 00
133	A. Brazee, watchman.....	25 00
134	Geo. E. Bryant, superintendent.....	65 00
135	E. J. Grover, forage.....	781 98
136	Evening Wisconsin, advertising.....	9 50
137	F. A. Lydston, superintendent	50 50
138	D. Stoddard, watchman.....	20 00
139	C. W. Burns, police	16 00
140	John Riley, police.....	16 00
141	Wm. Ream, police	12 00
142	James Stryker, police	14 00
143	J. B. Du Bois, police	14 00
144	P. Dodge, police	22 00
145	J. C. Denney, police.....	6 00
146	J. W. Sanford, police.....	6 00
147	Michael Gaff, police.....	16 00
148	Michael Realey, police	24 00
149	D. T. Pilgrim, police.....	6 00
150	Alfred Wood, assistant marshal.....	60 50
151	R. J. Day, police.....	16 00
152	R. J. Calkins, police	14 00
153	C. J. Putnam, police.....	18 00
154	A. A. Cogswell, police.....	16 00
155	L. B. Wood, police.....	14 00
156	W. Jeffers, police	12 00
157	E. Bagley, police.....	22 00
158	J. H. Warren, marshal.....	60 00
159	H. Newnham, police	12 00
160	W. J. Freel, police ...	25 50
161	A. H. Main, sundries.....	4 25
162	J. J. Norton, ticket seller.....	21 00
163	E. A. Boardman, ticket seller	28 00
164	H. Wingate, ticket seller.....	28 00

Warrant Account of the Secretary. — continued.

No.	To whom and for what issued.	Amount.
165	H. Sylvester, ticket seller.....	\$7 00
166	Albert Hopkins, ticket seller.....	28 00
167	N. Bowerman, ticket seller.....	28 00
168	J. A. Parker, ticket seller.....	14 00
169	W. Hardwick, ticket seller.	24 50
170	W. E. Main, ticket seller.....	28 00
171	F. J. Blair, treasurer.....	50 00
172	J. C. Otis, ticket seller.....	7 00
173	J. Van Etta, ticket seller.....	31 50
174	A. H. Main, assistant treasurer.....	60 00
175	D. Williams, clerk.....	31 50
176	Severence & Williams, music... ..	175 00
177	Briggs & Rothe, grain.....	99 46
178	W. A. Nowell, assistant superintendent.....	15 75
179	Byron & Henry, hardware.	1 95
180	C. H. Greenman, assistant superintendent.....	7 00
181	G. J. Kellogg, superintendent.....	62 75
182	J. L. Kramer, feed	18 00
183	W. W. Field, salary third quarter.....	500 00
184	W. T. Leitch, services in secretary's office.....	21 00
185	E. W. Keyes, post master, postage stamps.....	15 00
186	Winnie Bright, clerk.	17 50
187	S. D. Carpenter, printing.....	2 50
188	Herold Company, advertising.....	4 50
189	K. T. Graves, clerk.....	21 00
190	H. C. McDowell, superintendent.....	72 00
191	Geo. H. Daubner, premium.....	45 00
192	Eli Stilson, premiums.	190 00
193	Eli Stilson, expense account.....	68 55
194	Eli Stilson, per diem account.....	155 00
195	H. B. Sherman, board bill.....	46 75
196	L. E. Andrews & Co., livery.....	154 25
197	Blair & Persons, crockery.....	15 90
198	A. W. Cole, hardware.....	3 05
199	H. B. Sherman, premium.	15 00
200	C. Daft, premium.....	27 00
201	Luther Rawson, premium.....	112 00
202	Addie Littelle, premium.....	2 50
203	Miss De Etta C. Sturtevant, premium.....	4 00
204	J. G. Gasner & Co., power.....	200 00
205	C. H. Hall, assistant secretary.....	90 00
206	Miss Kate Pfeffer, premium	13 75
207	Geo. P. Pfeffer, premium.....	38 75
208	John L. Mitchell, expense account.....	16 50
209	A. L. Boynton, livery.....	6 00
210	A. E. Foote, whitewashing.....	25 00
211	Milwaukee News Company, advertising.....	56 00
212	Sentinel Printing Company, advertising.....	28 00
213	Lydston & Co., lumber.....	9 00
214	J. M. Smith, premium	19 00
215	Miss Emily T. Smith, premium.....	24 00
216	H. H. Greenman, premium.....	5 00
217	B. B. Olds, premium.....	4 25
218	W. W. Ellsworth, premium	45 50
219	F. C. Curtis, premium.....	18 50
220	Wm. Finlayson, premium.	5 00
221	Wm. Finlayson, premium.....	5 50

Warrant Account of the Secretary. — continued.

No.	To whom and for what issued.	Amount.
222	Charles Elson, superintendent carpentering.....	\$30 00
223	P. Struve, carpenter.....	9 00
224	John Libty, carpenter.....	4 50
225	Charles Sheff, carpenter.....	9 00
226	Mrs. Leom, ladies hall.....	14 00
227	L. K. Cogswell, premium.....	5 00
228	W. T. Smith, premium.....	47 50
229	Geo. Lawrence, Jr., premium.....	60 00
230	James McNee, premium.....	7 50
231	Charles Maffett, premium.....	4 00
232	R. Richards, premium.....	65 00
233	Hugh Williams, premium.....	17 50
234	John W. Thomas, premium.....	5 00
235	A. B. Medbury, premium.....	140 00
236	James Mason, premium.....	28 50
237	James Ozanne, premium.....	11 75
238	Seifert, Gugler & Co., diplomas.....	30 00
239	H. Rhodes, premium.....	5 50
240	Blum & Paulas, wood	30 00
241	Mrs. C. J. Wilkins, premium.....	12 50
242	L. Gredley, premium.....	6 50
243	L. L. Kellogg, premium.....	29 00
244	N. N. Palmer, premium.....	7 00
245	F. S. Lawrence, premium.....	8 75
246	Mrs. Fanny Vilas, clerk.....	45 50
247	Mrs. Fanny Vilas, premium.....	2 00
248	C. Daft, premium.....	373 00
249	M. Hoffman, watchman.....	28 75
250	N. Coffin, premium.....	8 50
251	P. A. Van Vranken, premium	10 75
252	S. A. Fox, premium.....	35 00
253	U. S. Express Company, express charges	9 05
254	J. D. Van Doren, premium.....	43 00
255	E. S. Hammond, premium.....	50 00
256	W. J. Park & Co., envelopes.....	1 50
257	Frank Boyd, premium.....	50 00
258	J. D. Garner & Co., freight, etc.....	65 00
259	J. D. Garner & Co., premium	42 50
260	Milwaukee Boiler Co., premium	2 50
261	E. P. Richardson, premium.....	2 75
262	A. A. Hammer, premium.....	125 00
263	Cramer, Aikens & Cramer, printing.....	9 75
264	C. W. Harvey, premium.....	3 00
265	Geo. Jeffrey, premium.....	28 00
266	Michael Ferrick, premium.....	5 00
267	C. J. Richards, premium.....	2 00
268	J. W. Park, premium.....	8 50
269	Eddie H. Park, premium.....	7 00
270	Merial L. Park, premium.....	4 50
271	S. B. Smith, premium.....	12 50
272	E. B. Thomas, premium.....	12 00
273	H. Ludington, premium.....	32 00
274	Kittie J. Durbin, premium.....	2 00
275	W. J. Park & Co., book binding.....	1 50
276	Rundle & Spence, plumbing.....	175 00
277	H. D. Gardner, premium.....	10 75
278	D. T. Pilgrim, premium.....	80 00

Warrant Account of Secretary — continued.

No.	To whom and for what issued.	Amount.
279	D. Huntley, premium	\$18 50
280	Boyce & Son, premium	27 50
281	G. Richards, premium	10 00
282	John Jeffers, premium	34 00
283	L. Howard, premium	4 50
284	J. G. Clark, premium	100 00
285	Peter Davy, premium	30 00
286	Wm. Harttert, assistant superintendent	85 00
287	Mrs. C. C. Kingsley, premium	8 25
288	Marcella Mitchell, premium	5 00
289	C. Leonhard, premium	3 50
290	James Webster, premium	7 50
291	H. O. Park & Co., bill posting	2 00
292	Wm. J. Lane, premium	4 00
293	Gould Nursery Co., premium	14 50
294	J. J. Smith & Sons, premium	15 00
295	Miss Nellie Jillson, premium	4 00
296	W. J. Denney, labor	17 50
297	Mrs. H. Fischel, premium	3 00
298	M. J. Cantwell, printing	29 00
299	Wm. Kitzrow, premium	38 25
300	Harding & Metchum, premium	55 00
301	Geo. W. Ringrose, premium	17 75
302	Rodney Seaver, premium	4 00
303	Hiram Conover, premium	17 50
304	Mrs. C. H. Root, premium	8 00
305	W. W. Field, bills and expense account	52 93
306	E. W. Keyes, P. M. box rent	2 50
307	P. Putnam, premium	8 00
308	James Lewis, premium	32 00
309	John Bredfield, cartage	13 00
310	Mrs. A. A. Boyce, premium	5 00
311	J. Stoddard, premium	52 50
312	C. M. Clark, premium	15 00
313	Isaac Anthony, premium	7 50
314	J. C. Metchum, premium	22 50
315	Louis F. Wergin, premium	3 00
316	E. D. Lewis, premium	8 75
317	S. J. Hook, premium	15 00
318	W. W. Woodard, premium	5 00
319	Geo. D. Doubleday, premium	87 50
320	E. C. Lewis, premium	197 50
321	S. L. Harrington, premium	5 00
322	Mrs. E. R. Copeland, premium	12 50
323	J. Johnson, premium	56 00
324	J. B. Judson, premium	4 00
325	E. & J. Smith, premium	70 00
326	A. H. Hart, premium	11 50
327	C. W. Walker, premium	7 50
328	Mrs. J. Wetherbee, premium	4 00
329	Mrs. H. P. Stone, premium	25 00
330	H. L. Hazlett, premium	7 00
331	Mrs. A. H. Cutting, premium	12 00
332	Joseph O'Malley, premium	22 50
333	John Cady, watchman	13 00
334	Geo. Benning, premium	9 00
335	W. E. Lewis, premium	3 00

Warrant Account of the Secretary — continued.

No.	To whom and for what issued.	Amount.
336	David Whitehead, premium.....	\$9 00
337	Wm. Reed, premium.....	21 00
338	Gould Bros.....	17 00
339	Mrs. Sally Bell, premium	3 00
340	C. Gibson, premium.....	27 50
341	J. C. Starkweather, picture frames.....	39 38
342	Thomas Irving, premium.....	17 00
343	G. Nicholson, premium.....	5 00
344	Notbohm Bros., premium....	5 00
345	Thomas & Joseph Dean, rollers.....	4 00
346	Mrs. W. A. Dean, premium	3 00
347	John S. Dean, filling diplomas.....	2 50
348	Robert Ogilvie, premium.....	60 00
349	H. R. Hubbard, premium.....	5 00
350	Stephen Bull, premium.....	75 00
351	M. N. Seward, premium.....	7 50
352	J. B. Johnson, premium.....	5 50
353	Reuben Strong, premium.....	5 00
354	F. J. Blair, dinner tickets.....	894 50
355	F. J. Blair, incidentals.....	4 00
356	L. Woodworth, premium.....	2 50
357	John Ballock, premium.....	7 50
358	J. C. Corrigan, premium.....	7 50
359	Jacob Fink, premium	7 50
360	L. Sackett, police.....	6 00
361	Dexter Curtis, premium.....	15 00
362	H. S. Durand, premium.....	135 50
363	Robert Thomas, premium.....	12 50
364	Atwood & Culver, printing	51 00
365	Fred Kubler, premium	11 00
366	E. J. & Wm. Lindsay, lumber....	4 65
Total amount of orders issued by the secretary.....		\$15,437 28
Amount of orders Nos. 423, 434, 451, 455, and 457, of 1875, paid by the treasurer ...		137 35
		\$15,574 63
Amount of orders Nos. 24, 234, 331, 334, 336, 339, 356, 358 363 and 365, of 1876, not received by the treasurer at the close of the year, December 5, 1876.....		74 50
Total amount of orders paid by the treasurer.....		\$15,500 13

EXHIBITION OF 1876.

OPENING ADDRESS.

BY ELI STILSON, PRESIDENT.

FELLOW-CITIZENS AND MEMBERS OF THE STATE AGRICULTURAL SOCIETY: We have convened here to-day to formally open the twenty-third exhibition of this society to the public. This society, founded soon after the young state of Wisconsin entered the galaxy of states as one of its brightest gems, has done much to improve and promote agriculture. Its annual exhibitions have yearly called out much of its finest and best products, and, together with its discussions, has given an impetus to progressive agriculture that will roll on, with the continued help that it is in duty bound to receive, until the state of Wisconsin will soon distance many of the older states of the Union in agriculture. When the pioneers of this state first came here, they found the beautiful prairies and openings inviting and teeming with luxuriant verdure; prairie flowers of every hue waving to the breeze and perfuming the air. But with the cultivation of so rich a soil came innumerable pests, both insect and vegetable, to sweep away the hopes of the husbandman, and his brightest hopes often ended in severe disappointments. Rust and mildew, the Hessian fly and chinch bug, the moth, with his numerous species, came to devour and eat up the labor of the farmer. But, thanks to a diversified and experienced agriculture, we are now able to ward off, in a measure, the severities caused by the partial failure of a single great staple crop of the state. The consternation, dismay and distress caused by the blight of the hedge-row wheat in 1851 and 1852 will long be remembered by the hardy pioneers of the state. The folly of the agriculture of a state being dependent on the success or failure of a single crop then became apparent. But first, for want of practical avenues of communication

the improvement was slow. But as the avenues of communication between the farmers became practical, farmers increased, the improvement became more rapid, and the success or failure of this or that method became the common knowledge of the whole. The absurdity of depending on a single crop, the constant and further exhaustion of the soil without some compensating return to it as a fertilizer, the growing of scrub, or inferior stock at a positive loss, and other like methods, are fast becoming things of the past, and farmers are becoming better acquainted with the necessities and requisites of their calling.

Improvement and progress are the watchword and reply, and the farmer who will not take heed to his own experience and that of others had better change his occupation at once, for improved agriculture will produce more and cheaper, and undersell him in the markets, and at better profits. As this is the "Centennial year" of our national independence, a slight retrospective view of agriculture, then as compared with it now, may not be amiss.

Our revolutionary forefathers plowed their lands, not as the old Romans with their oxen hitched to a crooked limb of a tree to loosen up the soil; no, not they; for they had wrought the tree into a wooden plow with a trifle of iron on the lower edge of the mold-board for a lay; and fancy to yourselves the sturdy yeoman of that period with his fine wooden plow, how he must have felt elated that he was not compelled to do as Romans did, tie the yoke to the oxen's horns and use a crooked limb for a plow while he was marking out the boundaries of Rome. Compare the wooden plow that that brave old war-worn veteran, General Putnam, was ploughing with when he heard the first gun of the revolution, with the hardened and brightly-polished steel plow of to-day, that cleaves and turns the soil of Wisconsin, and we have some idea of the improvement in tools for the use of agriculture that has been made in one hundred years.

Again we may only go back half of that period to find the farmer stooping, and with the sickle in his hand gather in his sheaves by the slow and toilsome progress of reaping. But now the stately reaper goes forth into the ripening grain and the harvest is rapidly gathered in. Then our forefathers threshed their grain by that slow and tiresome process, the flail. Now the thresher and often the steam-thresher does the work, and it devours the sheaves of

grain like a monster, and as Napoleon said at the Paris Exposition when looking at the Pitts American machine, that it was terrible to behold. Railroads now span the continent and penetrate every agricultural district to carry the farmer's products to market, and steamships plow the mighty ocean freighted with the products of every clime, and the telegraph with lightning speed tells the wants of every market and the rise and fall in price of every product.

Standing as we do at the close of the first century of American Independence, and just entering on the second, as we cast our eyes backward and behold the great progress that has been made since the time that the bell pealed out its tones on the midnight air that an independent nation was born, and then by a prophetic eye penetrate the vista of future years and attempt to grasp and comprehend the vast magnitude of the improvements and discoveries that will be made in the next hundred years, we are overwhelmed with the thought. That improvement is to stop or even slacken, no close observer will believe.

Where is the man that is to attach steam to the reaper, as has been done already to the plow, or, more practical still, where is the man that is to perfect the binder until its operations shall become so perfect that the reaping and binding of a score of acres of wheat shall be only an ordinary day's work? Where is the man, or set of men, that are to teach the farmers by precept and example, too, how to double the productiveness of their soil, and cheapen the cost of production? They are coming. Then let us see to it that agriculture keeps pace with the other industries in this grand march of progress. But while contemplating the bright future of agriculture and manufactures, and other kindred industries, there is another and sadder thought that steals in unbidden. Shall the nation celebrate a second Centennial where the present is, and where American liberty was first cradled, or shall bribery and corruption, like the rust and mildew, and like the chinch bug and moth, suck up the life blood of the nation, and we go to decay? Rome fell, not by her external foes, but by her internal corruptions. Farmers of Wisconsin! see that your laws are made for plowholders as well as bondholders. We, as farmers, will do our share in paying the national debt at 100 cents on the dollar; but let us dismiss from power, without regard for party, those political demagogues that would make us pay 120 or 130 cents on the dollar for

the benefit of Wall street and the Gold Room, by demonetizing silver, at the expense of agriculture and all other industries.

Intelligence and virtue are the safeguards of a free people; and while one hand guides the plow, rise above party prejudices and let the other guide the ballot with intelligence and wisdom. Remember that an intelligent agriculture never flourished long in any country after constitutional liberty had forsaken it. Let me call your careful attention to the exhibition before you. It has been gotten up at great expense of labor and care on the part of the exhibitors and officers. It has required an unshaken confidence in the good of our cause, that under the financial embarrassment of business generally, and a short crop of one of our great staples, that all have contributed so well to the success of this exhibition.

THE HORSE DEPARTMENT.

This department will be found to contain many excellent specimens, showing their adaptation to the several purposes for which they were bred. The draft horse, the horse for general purposes, the roadster, and the fast horse, are all well represented. When we see how important a part the horse bears in the economy of agriculture, we cannot well overrate his importance; and he is equally necessary to other branches of industry. And the improvement is so marked and prominent that every observer can but note and admire it.

CATTLE DEPARTMENT.

Here we find the stalls filled to their full capacity, and prominent among them we notice the short horn, noted for their milking, beef qualities and adaptability for the improvement of the common stock of the country. Kentucky, Illinois, Ohio, Canada and England are represented by animals bred in those states and countries, but some Wisconsin bred are equal to any on the ground. The Ayrshires are present in goodly numbers, and will find a place in the cheese dairies for which they appear well adapted. The Jersey is also present and a candidate for public favor for butter and for rich milk, and is better adapted for the city than for the general farmer.

The Devons have long been before the public, and the several purposes for which they are specially adapted are well understood.

The Galloways are of more recent introduction, and time will test their merits for Wisconsin. Their color and the peculiarity of their build attract much attention.

SHEEP.

Here the exhibition is large and contains many fine specimens. The Merino stands at the head of the list for clothing wool, and shows the marked effects of hundreds of years of careful breeding. The Downs excel for mutton, but not for wool, while Cotswolds, Leicesters combine combing wool with mutton qualities in a good degree. Each breed is adapted to a specific purpose, and shows how our domestic animals may be improved by careful breeding by experienced breeders of stock, like a Bakewell, a Hammond, and a Randall. The benefit of this branch of industry are three fold — food, clothing and richness of soil.

SWINE.

In no department of domestic animals is the improvement so apparent to the casual observer as here. The long-nosed, long-legged flat-sided, prairie rooter, with form and propensities better adapted to speed than propensities to fatten and flesh, have given place to the fine, round, easily fattened Berkshire and Poland-China of to-day. The same feed will produce 40 per cent. more money for the product when fed to the improved breeds. In a financial point of view, swine occupy a high position in the finance of the Western farmer and the nation, and their improvement is so much wealth added to this industry.

POULTRY.

This, at first, may appear to the casual observer to be of small importance; but when we find the aggregate value of this production and then consider its importance in domestic economy, we can but appreciate the marked improvement that has been made, not only in the production of beautiful specimens, but also in usefulness and quality.

AGRICULTURAL HALL.

Here we find an exhibition of the farm and dairy products of Wisconsin that is truly gratifying. Both are excellent in quality and abundant in quantity. Wisconsin dairymen may well be proud of the high rank that their products have taken in the Centennial and in English markets.

HORTICULTURAL AND FLORAL HALL.

While our horticultural friends have done much in the produc-

tion and exhibition of fruits, and are deserving of great praise for their success, high honors must be awarded to the ladies for the fine floral display as well as for their exhibits in several other departments. The ladies are doing a noble work in the aid and assistance that they are giving our fairs, and strewing our paths of life, as it were, with flowers. Happy is the man who, amidst the buffeting and turmoils of life, can appreciate and is surrounded by the floriculture, the handi-works and the works of art of our lady friends and their refining influences.

FINE ARTS.

When we consider the unfavorable weather that has prevailed for the last two weeks, we are surprised that so fair an exhibition could have been had of works of art. The individual merit of the articles on exhibition of this class commend themselves to the close observation of the public.

MANUFACTURES.

Here we find two large halls filled to overflowing with the products of American and domestic manufactures. For durability and usefulness, the American manufactures stand unrivaled throughout the world. As an English board of trade truthfully report "that the American manufactures are fast supplanting the English in their colonies; not that the Americans make a cheaper, but a better product."

The importance of this branch of national industry, of which this branch of the exhibition is but a partial exponent, cannot be overestimated, but with a sound political economy, will increase in excellence, and be cheapened in production, and will add to the home market of the farmer.

MACHINERY.

The busy hum and the ceaseless throng will attest the success of this department of the Fair. The improvement in machinery is stamped by progression, year by year. This strong right arm of agriculture is adding new sinews of industry yearly. It multiplies the power of labor many fold, and works with greater precision than hand labor. It relieves labor of much of its hardships, but makes a demand for a higher intelligence and skill to guide it to success. And speed on the day when it shall still further lighten

the labors of the farmer, and give him more time for thought, intelligence and social culture.

With my best wishes for the success of all these industries, and thanks to my associates and the press and public for the assistance rendered in this and former exhibitions, I now proclaim the twenty-third annual exhibition of the Wisconsin State Agricultural Society open to the public. You will find much to please and instruct, and notwithstanding the adverse circumstances and unfavorable weather, the exhibition, in several departments, is the largest ever had in the State.

ANNUAL ADDRESSES.

[Delivered on the Fair Grounds, September 14, 1876, by Hon. HARLOW S. ORTON and His Excellency, HARRISON LUDINGTON, Governor of the state.]

RELATIONS OF BUSINESS.

BY HON. HARLOW S. ORTON.

Man is developed, improved and elevated by the use of all his powers and capacities in the relations of society and in the discharge of those practical duties required by that bond by which society is formed and preserved, by which "all gain to guard what each desires to gain." We cannot contemplate man as an individual, solitary and secluded from the intercourse and habits of his race, and speculate and philosophize about him as a separate identity, any more than upon some strange animal whose native haunts and habits with his kind are unknown. We can only comprehend in some degree our mysterious existence, purpose and destiny as we are affected by the regulations, inducements, motives, duties and obligations of society, and this is the respect only in which "the proper study of mankind is man." His relations and obligations to his fellows are intimately associated with and dependent upon his relations and obligations to his God, and in both, he is subordinate and a relative part and a mere factor, of that grand and sublime place and order in the physical and mental universe, "whose body nature is and God the soul."

"God never made an independent man ;

'Twould jar the concord of his general plan."

Dependent and correlative particles and forces constitute the world of organic and inorganic matter, in all its everchanging variety of forms, in constant and eternal motion, by natural affinity and repulsion, marshaling properties and ingredients into proportionate and nicely balanced combinations, each part essential, and

the whole complete. Particles inert and apparently useless in themselves, when brought in the mysterious laboratory of nature into contact and under the influence of each other, and other and dissimilar particles, each becomes a necessary contribution in accomplishing the purposes of the whole. So everything in the universe has its appropriate place and uses, first as elements and then as organisms which, when brought by the Creator into one great world, made perfection itself worthy of the comprehensive benediction, "It is good." We learn great lessons from these processes of nature and all the phases of life, and all the accomplishments of organic society are modeled from the phases and order of the divine economy.

The arguments of ancient philosophy to prove a great first cause and sovereign ruler of the universe, were drawn from the evidences of a common design and universal law which brought into being and control the world of matter and of mind. This was an old earth long ages before it was fitted for the habitation of man. It came naked from the womb of time. Its cold and rugged surface was the bare and solid rock. It had no superficial incrustation of earth—no soil containing the embryo elements of vegetable life. Its preparation for our abode was, through gradual evolution and development, by natural processes and active forces, set in motion by the Divine Will, and regulated and controlled by laws as unchangeable and inflexible as that Will itself. In all the changes and mutations by which our earth was thus fitted for the maintenance of animal life, by the apparent accident of fire and flood, there runs a design and plan as clearly manifest as in the original creation, by the fiat of the Almighty. The first soil was made by the detrition and erosion of the rocks by water, ice and fire, by which they were disintegrated into pure sand, containing none of the elements which could produce and nourish vegetation. It was totally destitute of carbon, nitrogen, hydrogen and oxygen, the chemical ingredients of plant life.

These elements then existed only in the circumambient air, to be inhaled by the leaf or carried by rain drops to the roots of that first crop of vegetation mysteriously begotten, but by natural causes, and suspended between earth and sky. These were the air plants and masses of the silurian age, the first green promise of shrub and tree, of flower and fruit, and of the tender blade and the ri-

pened ear of a future age, of more perfect and lusty life. This incipient vegetation decayed, and, by its decomposition, spread over the earth the first thin mold containing these ingredients of life which had been gathered and treasured in organic form, for this predestined period of animal and human creation, and so on by successive growth and decay, a fruitful soil was made on which animal life could find spontaneous subsistence, and man, by his first occupation of agriculture, could find his bread "by the sweat of his brow." In the processes of the development and production of vegetation, which is nothing more than a combination of chemical elements into organic form, there are relations and dependencies strikingly suggestive and emblematic of these relations and dependencies essential to the organization of civilized society in its highest form.

In the treasury of nature there is no waste, no loss of a single atom, but in an endless circle of progression the material is utilized over and over and forever. These chemical ingredients even after death, lie slumbering in the bed of decay, to arise into newness of life and into more perfect organization, so emblematic of the resurrection.

An essential to perfect vegetation is the element of water, which in dew and rain, it may breathe through its lungs of leaves, or copiously imbibe through its branching network of roots. Water holds in solution its chemical and mineral food on which it feeds and lives and grows, and which it can only receive and assimilate in fluid form.

How beautiful and perfect that process of evaporation, by which, under the action of the sun, moisture arises into the upper air and spreads its thin and gauzy veil over the blue sky, or gathers into the black and threatening storm cloud, and by attraction and motion its tiny drops are mingled and enlarged, and by gravitation fall in strong torrents or in gentle showers.

The great oceans were once the only source of this evaporation, and the coast regions received at long intervals a rain fall, and thus afforded but small and limited spaces for feeble and sickly life. There were no inland seas or lakes or rivers, from which evaporation could arise into the air and absorb its gases and come down in fructifying rain and dew.

The vast regions lay then a hot, seething, lifeless desert. There

then were great upheavals and subsidences, caused by internal fires and the unequal cooling of the earth's crust, and vast mountain ranges, here and there over the continents of land, arose high up into the rarer and colder atmosphere of the sky, having spread out at their feet broad plains and deep valleys.

The summits of these mountain ranges became the reservoirs and receptacles of condensed moisture, which a thousand winters converted into solid ice, lying in deep and ever-thickening masses on the peaks and in the crevices, which intervening and succeeding summers melted away, little by little, drop by drop, and yet more and more, until first the rill and then the rivulet, starting upon the mountain brow, go leaping and dancing and singing down its rugged sides, until they meet from a thousand ways in some deep depression, where a lake is formed, which flows off in rivers, and these again commingling from those mighty and resistless flood streams, which wear down and cut through the solid rock, and then move on in quiet current, smooth and deep, across the plains and into the ocean gulfs. These rivers irrigate and make fruitful all the plains and valleys on their course; not as new and near sources of evaporation only, but by percolation and spreading moisture through and over wide surfaces beyond their beds, and vegetable life springs into being and has become the best fitted habitation of man and beast.

These are the chosen regions of the earth, for population, for agriculture, and all the arts and amenities of civilized life.

How grand, and how absolutely essential to the existence of the human race were these great and marvelous changes in the earth's surface, which appear to the unthinking mind to be mere effects and consequences of accidental and fortuitous natural causes, set in motion by molten and cooling and shrinking matter, and by the expansive force of the earth's struggling gases. And yet, how clearly the design of God appears in all these movements and apparent changes of His universe by which he has fitted this earth for the habitation and sustenance of that strange being called man, whose body "is of the earth, earthy," but whose soul is of the essence of Deity. From the icy storehouses on the tops of the Alps and the Appennines, and the hardened snows and glaciers clinging to their serried sides, loosened and melted by the winds, heated by the burning deserts in Africa, blowing northward in the summer,

all the mighty rivers which irrigate the continent of Europe have their sources.

The Rocky Mountains in the same way on this continent give rise to the Missouri and Mississippi, and the Alleghany range to the Alleghany, Monongahela and Ohio, which make their vast and broad valleys the richest country in the world; and so of the Cordilleras of South America, which give rise to the largest river in the world, the mighty Amazon, and so of the Caucasian mountains, from which flowed the Oriental Euphrates and kindred rivers, which are supposed to have inclosed and watered the fabled garden of Eden. There is nothing in the vegetable kingdom more majestic and beautiful than a grand old forest tree, that stands firmly balanced and deep-rooted in the ground, and sends up its mighty trunk towards the sky and tosses its gigantic limbs in every gale, or crowned with its green dome of leaves, it stands motionless in the quiet air, or rustles in the gentle breeze, "in storm a shelter and in heat a shade." Did you ever think how many natural agencies have been employed in its production, and how various the material of its construction?

Decomposed animal and vegetable matter, silicious sand, clay, carbonate of lime, with more or less oxide of iron, magnesia, and various other salts, compose what we call loam, the soil primitive of vegetable life, and formed as I have mentioned. The earthly or mineral ingredients are the inorganic constituents, and the gases of carbon, oxygen, nitrogen and hydrogen, the organic constituents of all plant life. On decomposition, the ashes indicate the proportion of the mineral salts, while the gases return again to the air.

Thus, in the production of the tree, earth, air, the sunlight and water, contribute their several proportions of ingredients, and when mingled and combined by the ever active forces, this perfect and beautiful new organism, or new creation, comes into being, answers its predestined uses, and then goes back into its original elements again, to be reproduced in successive birth, growth and decay, forever, without one particle lost or annihilated, in obedience to the general order and harmony of the universe. Now, it may be asked with some propriety, what have all these various natural causes, combinations, relations and dependencies in the material world, to do with the published theme of this address, "The Relations of Business," which exclusively concerns that department in civilized

society called political economy? I have already called your attention to the analogies between the processes of nature or the works of God and the organization of human society, and I now claim that those systems of social sciences and practical economy which are framed upon the recognition of these relations and dependencies in material organisms, will be the most perfect and best adapted to promote the object in view, the greatest general good. I will go further and say that they are so framed, as will be clearly apparent when fully considered and understood. When the earth is fitted to receive him, man, civilized man, makes his advent, is placed in the most fruitful and productive region, and commanded to "till the soil and dress it," and thus was inaugurated the primeval and the most natural human employment, agriculture. He is to make available to his use the most generous agencies of nature, ready to aid him in the production of his subsistence and comfort. He cannot use with profit his naked hands. He must have tools and implements of husbandry. Seed time is at hand and the harvest will not wait, and he has no time to procure the materials, and has neither the time or skill to construct them. To his opening and quickened mind, the thought gains lodgment that some one ought to leave exclusive tillage and devote his time, and skill, and labor to the manufacture of these implements as a separate and distinct employment, and thus is begun the business of the mechanic.

This primeval farmer must have also clothing for himself and family, vessels and vehicles for the keeping and the carrying of his food, and implements for its preparation for the stomach. He and his family must have shelter and conveniences for rest and recreation in his intervals of labor. All these new constructions require peculiar skill and labor, which he cannot and has no time to bestow. Here we have various and distinct occupations, for the tailor, the house builder, the moulder, and the worker in metals, or the blacksmith. He employs all these classes of workmen and pays them by his own farming products, which they have no time to produce. He then supports them in one sense, and they support him by giving him the better means of production, in exclusive time, attention and implements, and in his comfort and convenience. There is no antagonism here so far, most certainly, and the benefits are mutual and reciprocal.

All these men, by virtue of their special and peculiar and exclu-

sive employments, become more skillful, and their inventive faculties are quickened to discover and make advanced improvements and a better and more efficient application of labor, and correspondingly they improve mentally, physically and socially, and soon acquire other wants adapted to their improved condition.

The farmer discovers that in a distant latitude and in another climate, the farmer produces a different quality and kind of vegetables and fruits, for which he desires to exchange his own, and this desire is mutual with both. They have not the time or the means to make the exchange, and so some one is assigned to the duty, or business, and he buys of the one and sells to the other, and receives his compensation by a small profit, and here we have the merchant.

Soon it is found out that the mercantile agent acts to great disadvantage by combining two employments incompatible with each other, viz : Merchandising and transportation or carriage, and it is discovered both by the farmer and himself that it would be more profitable for them both to separate them, and here we have the common carrier.

To pursue his avocation, he must have the best means of transportation by water and by land, and the employments of the boat and carriage builder are established, and with them the peculiar business of men to manage and take care of these new constructions.

In the meantime mankind has advanced in intelligence and culture, and the population has increased, and frequent conflicts of interest occur, and wrongs are committed, and they realize the want of common protection, and some authority which can define their rights and redress their wrongs, and a

SOCIAL AND CIVIL COMPACT

is formed, laws are enacted, and courts are established to administer them. Officers and agents of government are found to be necessary, and lawyers educated and informed in civil jurisprudence to be competent judges and counselors; and thus new occupations are made, requiring special ability and aptitude for such high trusts. And all for what ? To secure to the farmer the products of his industry and labor in tillage, and to all the other branches of business which have naturally grown out of the original foundation avocation of agriculture and necessary to it. Society advan-

ces and improves, sufficient general intelligence prevails to feel and appreciate the want and to suggest the means for the education of the children and youth, and schools are opened for general instruction, books are made, newspapers are published, and all the various occupations in the republic of letters have become necessary for the same purpose, the general good. The health and vigor of the body, the integrity of the conscience, moral purity and the obligations of moral duty are felt to be indispensable to well regulated society and general order and individual happiness, and the physician and minister of religion are assigned to these high places of employment. In the ever-widening field of inventive genius the great agencies of steam and electricity have been brought into subjection and practical utility, and have increased a thousand fold the advantages and the products of all human employments, and made necessary a great many new and special departments of business, and have brought all the commercial nations nearer to each other in familiar and profitable intercourse, and vastly increased the facilities of human progress and

UNIVERSAL CIVILIZATION AND HAPPINESS,

improved implements, machinery and methods of husbandry, mechanical labor of all kinds and branches of industry have been readily adapted. All the available portions of the earth's surface are being brought into cultivation to meet the new and increasing demands for subsistence and the luxuries of life, and the markets of the world. Under the operation of this completed system of political economy, in which all the capabilities of man, all the agencies of nature, and in short all the resources within human reach have been utilized, the civilized world has well nigh reached its culmination of material and intellectual improvement and happiness. The whole structure of our

PRACTICAL ECONOMY

has gradually grown up and out of natural conditions, and has been established in the philosophical fitness of things, and in my opinion as a whole, and in all its parts and branches, is as near perfection as human wisdom is able to devise, and adapted to the best possible condition of society. In this grand structure, from its foundation in man's first and chief employment, agriculture, to its

finished completeness by the embellishments of art, how clearly appears the well adjusted rotations and dependencies, and the reciprocal aids and advantages of the various departments of human industry and skill, and how inseparably connected and interwoven are all the employments involving the lightest use of the muscle, the brain and the heart, and all of the interests of society.

There is and can be no absolute independence in business, and there should not be any jealousy, envy or hostility when each separate branch is so necessary to the prosperity of the whole. The system being so obviously perfect, where is there any just cause of complaint? It must be in that

LEGISLATION AND GOVERNMENTAL INTERFERENCE

and attempted control, which are prompted by class and selfish interest to favor one branch of industry, or certain branches of it, at the expense and to the injury of the others, and consequently to the whole. If the unwritten laws of our political economy, which have come into existence and equal and impartial action with it, and out of the very exigencies and necessities of its ever changing conditions, and which will always run parallel with all the interests of every department, and regulate the whole, were not sought to be amended and overruled by arbitrary enactments, there would be no complaint. The remedy for any real or imaginary evils which exist is not in the change of the system, but in allowing each department to fill its true place in the general order, and receive its equal share of advantage in the general distribution of the profits of labor and skill. When by usage or assumption these unwritten laws and well adjusted regulations are violated, then it may become necessary by legal enactments to

RESTRAIN AND CONTROL EACH DEPARTMENT,

and keep it within its proper time and relations, so as to prevent special privileges, unequal advantages and monopoly. Injustice, tyranny and oppression, by law, towards any special branch, is no more ruinous to the general interests of trade and industry than laws specially favoring one branch above another. "Free trade and equal rights" should prevail in spirit and in practice in all departments of industry, and throughout the commercial world, and nothing but a great necessity can justify exceptional infraction of

their foundation principle. They "live and let live fair play," and no partiality or favoritism; each department recognized and conceding equal advantages, and the obligations to the social and civil compact and all the "relations of business" will remain properly adjusted, and the whole system of the economies answer the true purpose of its formation, and the highest good be attained by human society.

REMARKS OF GOVERNOR LUDINGTON.

MR. PRESIDENT, LADIES AND GENTLEMEN: It has been the custom of the Executive of the State to address you; in order not to disappoint you, I will make a few remarks.

The Nation is celebrating the close of the first century of its existence, and at Philadelphia we are exhibiting the results and evidences of the progress that we have made in the arts, sciences, industries and all the conditions of life. Wisconsin has no centennial to celebrate. She has occupied a position on the map as a geographical division of the country, for only forty years, and it is less than a third of a century ago that she joined the sisterhood of states. That we may realize what progress has been made by our State, it may not be inappropriate for me to present a few

PERSONAL RECOLLECTIONS.

Thirty-eight years ago this ground which we now occupy was a dense forest. There was no road from Milwaukee to the interior of the Territory. The first road, which led to Madison, was surveyed in 1838. Immigrants were compelled to cut their own way through the timber, and the first wagon that went from here to Watertown was three weeks in traveling that distance. At that time there was little grain grown in the Territory, and none for market. The first load of wheat offered for sale in Milwaukee, that was raised in Wisconsin, was grown on Caldwell's prairie, in 1840. I purchased it for 50 cents per bushel, and helped to carry it up stairs and empty it into barrels, thus earning the name of being the first elevator in Milwaukee. At that time farming was done with the most primitive machinery. The first cast-iron plows in-

troduced into the Territory were from Peekskill, New York, and met with great favor among the people, being far superior to any in use at that time.

Notwithstanding our want of comforts and conveniences, my recollection is that we enjoyed ourselves rather better than we do now. Our wants were few, and

OUR ANTICIPATIONS GREAT.

Now our wants have increased, while some of our anticipations at least have not been realized. I cannot escape the belief that if the people would practice the same economy now that was practiced by the settlers of Territorial Wisconsin, it would do much to solve the problem of hard times.

In this connection it may be some satisfaction to know that the hardships which we suffer from the present depression in business are vastly less than those that were suffered in 1837 and again in 1857. In the former year the inhabitants of the Territory were almost reduced to a state of starvation. Only a small area had been cleared for farming, and there was not enough wheat raised in the Territory to supply the people with bread. The

CURRENCY HAD BECOME WORTHLESS,

in consequence of the failure of the banks, and many persons were without money to buy the necessaries of life. In 1857, another panic visited the country, caused, as panics always have been and always will be, by a disposition among the people to accumulate wealth by other means than honest industry.

We have only to look upon the scene within this enclosure to be assured that Wisconsin possesses the resources and the energy to recover from the present depression, and to become a great and prosperous State. To accomplish this we must work diligently, and let our work be guided by intelligence and the lessons of experience. In the light of these lessons, clearly repeated the present year, it can hardly be necessary to suggest that the raising of wheat must be, if not abandoned,

AT LEAST GREATLY REDUCED

in its proportion to other branches of agriculture. The considerations in favor of stock-raising have been frequently presented, and

I need not repeat them. You will permit me, however, to suggest that you will find it to your advantage to breed only from choice and blooded animals. It is gratifying to know that within the past five years our farmers have made excellent progress in this respect. Indeed, there is no respect in which the

AGRICULTURE AND INDUSTRIES

of Wisconsin have not made good progress, and a visit to the Centennial Exposition at Philadelphia will prove it. You can imagine what satisfaction it afforded me to learn that our State stood first in dairy products, probably first in the manufacture of leather, and that she is sure to take high rank in the horse and sheep departments.

During the past year I have visited ten different States of the Union, and my observations confirm my pride in Wisconsin, and my confidence in her destiny. What this destiny shall be depends largely upon her agricultural interests, and it rests with you so to perform your part that when her centennial comes, it may be celebrated by a large and prosperous population, surrounded by evidences of wealth, cultivation and an advanced Christian civilization.

REPORTS OF SUPERINTENDENTS.

DEPARTMENT A.—HORSES, ETC.

BY H. C. MCDOWELL, SUPERINTENDENT.

In making a report in Department A.—Horses, I must express myself as being highly gratified with the exhibit made at our State Fair of 1876. Being a stranger in this comparatively new state, I did not expect to find so large an exhibit of good, well bred horses of all classes as were there produced. Draft stallions, Clydes and Normans, brood mares and colts, of the two families, were there in full force, and in numbers and quality could not be surpassed. The show of roadsters was very large, exhibiting some of the best types of the Hambletonian, Mambrino, Abdallah, Alexandria, Norman and Clay families. Nor was this showing confined to stallions alone; the brood mares were there, showing the offsprings of the above horses, and as far as quality, size and action were concerned, appeared to me the finest exhibit in this class that I ever saw in a show ring. In carriage horses the showing was not as large as I had hoped to see in this very important class; yet the exhibit was good, and I would here suggest that the board, if possible, give more encouragement to this much needed class of horses. I was much pleased to find the number of entries in the general purpose horse so few, and the sooner this class is stricken from our premium list the better. Let us instead, encourage the breeding from the best and distinct families, and throw out all mongrels of every class. In the speed class, although entries were not as large as I expected, I think had the weather been good they would have been sufficient to have made our purses whole. I know a good many came there to trot, but would not enter on account of the bad weather, nor do I blame them. Had not the elements been in a conspiracy against us, I think we would have made as fine an exhibit of speed as was ever shown at any state fair in any state, and as it was, I think our

earnings would have been very light indeed had it not been for the contests in speed. I here wish to suggest to the board, that we give three purses for speed, as follows: One for all stallions, one for 3-year-old colts, and one for 4-year-old colts, all owned in the state. I do not propose to make the purses large, but sufficient to pay expenses. Let the remunerative part of it be glory. I think it would be a great stimulant to breeders, and would prove highly satisfactory.

In conclusion, let me thank the judges, owners and drivers who so faithfully and patiently assisted me through those terrible ten days of rain and mud.

DEPARTMENT B.—CATTLE.

BY GEO. E. BRYANT, SUPERINTENDENT.

The undersigned, in retiring from the superintendency of the cattle department, desires through you, to say his thanks to the exhibitors of neat stock, for their general courtesy and willingness to forbear, during the awful wetness of the last fair. A bigger hearted set of men than the breeders and showers of neat stock in Wisconsin, don't live. Their hospitality is larger than the bulls they grow; their generosity broad as the prairies upon which they feed. Long may they successfully continue to grow the ponderous Short Horn, the beautiful Devon, the milky Ayrshire, the creamy Jersey and the muley Galloway.

The show of cattle at your fair of 1876, as a show, was never surpassed in Wisconsin.

DEPARTMENT C.—SHEEP.

BY A. A. BOYCE, SUPERINTENDENT.

While the exhibition in this department in point of numbers was not equal to that of last year, it is gratifying to know that in the quality of the stock exhibited there has been no falling off. Many

who had made entries of stock were prevented from exhibiting them, owing to the continuous wet weather during the fair.

The breeders of this state have made a steady advance in the improvement of sheep, in all the desirable qualities. They have by importation added to their flocks many choice pure bred animals. They merit the thanks of all who appreciate the importance of sheep husbandry in this state, and with proper encouragement there is no reason why Wisconsin should not soon take rank with Vermont, New York, or any other state, in the number and value of pure bred sheep. Our soil and climate are well adapted to sheep husbandry.

AMERICAN MERINOS.

The show in this class, though not large in numbers, has rarely been excelled in the excellent quality of the stock. The intelligence and energy of the gentlemen engaged in this state in fine wool growing and the breeding of American Merinos have resulted in a marked increase in the weight of both carcass and fleece, while the quality of the wool has also been improved.

LONG WOOL.

The exhibition in this class was particularly good; nearly equal to that of last year. The wet weather prevented some from bringing their stock; otherwise the exhibition would have been one of the best ever made at our state fairs. The increased attention given to sheep in this class has produced so marked an improvement in numbers and quality, that our breeders are no longer under the necessity of importing pure blood animals, but are prepared to sell to others.

SOUTH DOWNS.

In this class there were a few pens of very good sheep that attracted the attention of the friends of this, the best of all sheep for mutton.

DEPARTMENT D.—SWINE.

BY A. A. BOYCE, SUPERINTENDENT.

The exhibition in all the classes of this department was undoubt-

edly the best and largest ever made at any of our state fairs. All the pens were full, and many pens were overcrowded, there not being a sufficient number of suitable pens to accommodate the stock placed on exhibition, and some of the unoccupied sheep pens were used for swine. The greater part of the premiums awarded in the different classes were fairly won by Wisconsin breeders, and not as heretofore by breeders from other states. The improvement in the quality of the stock in all the classes, entered by Wisconsin breeders, was very marked. It is a noticeable fact that the numbers of white swine exhibited at our fairs are constantly decreasing, while black swine are yearly on the increase.

LARGE BREEDS

Were represented by Poland Chinas and Chester Whites, the former breed largely predominating, and it would be difficult to find, anywhere, animals of this famous breed that would excel those placed on exhibition by Wisconsin breeders. There were a few pens of very fine bred Chester Whites, that attracted considerable attention, and that the fine quality of the stock was appreciated was evident from the sales made on the ground.

MIDDLE BREEDS.

The Berkshires were the only representatives of the middle breeds on exhibition. The many fine animals of this popular breed attracted deserved attention, and was conclusive evidence that the admirers of the Berkshires need not now go abroad for fine breeding animals.

SMALL BREEDS.

In this class were found the Essex and the Suffolks. Each of these breeds are held in high esteem by many breeders. Their many fine qualities commend them to a large number of persons, and that the number is increasing is manifest by the inquiry for and ready sale of breeding animals.

DEPARTMENT E. — POULTRY.

BY D. J. CLARK, SUPERINTENDENT.

In this department, the entries are somewhat larger than they were last year; though they are smaller than they were in 1873 and 1874. The society is greatly indebted to Mr. H. D. Gardner, assistant superintendent of this department, who, by going to poultry breeders, succeeded in getting a large number of fowls, that otherwise would not have been exhibited. The quality of the birds, I am happy to say, with but few exceptions, is very good. Few persons are aware of the enormous value of the poultry product of the United States, or even this state, nor are they aware of the improvement which has been made within the past few years, by careful selection and breeding. And yet, when we look at the premium list, we find it the smallest of all, compared with the value of the production, and the attractiveness of a really good exhibition. Our show comprises five coops of Light Brahmas; two coops of Dark Brahmas; four coops of Buff Cochins; four coops of Partridge Cochins; eight coops of Games; five coops of Plymouth Rocks; four coops of Black Spanish; four coops of Brown Leghorns; nine coops of White Leghorns; two coops of Houdans; one coop of White Crested White Polish; two coops of Black Red Game Bantams; one coop of Golden Seabright Bantams; one coop Silver D. Wing Game Bantams; one coop of Wild Geese; 3 coops of Aylesbury Ducks; two coops of Rouen Ducks.

A greater variety and larger showing could, and would be had, by holding out inducements, by suitable premiums, that would in a measure compensate the breeder of choice and valuable fowls for the risk he takes in sending them a long distance to put them on exhibition. While under the present arrangements, only those will exhibit who reside at a near and convenient locality to the Fair, and are willing to sell such birds as they show.

I know that the stock in this state is worthy to compete successfully with any in the United States, and it only needs encouragement commensurate with its value to bring it out. I would therefore suggest the following changes to be made in the next list issued, viz: that all fowls be shown in pairs instead of trios, as heretofore, and that the sum of \$300 be apportioned to this department,

and that the premium list be revised by a committee of prominent poultry men. Then I think you may reasonably expect a full and complete exhibition in this department.

Owing to the unfavorable weather at the beginning of the Fair, our show was not as complete as it would have been if we could have had fair weather.

DEPARTMENT I. — MANUFACTURES.

BY SATERLEE CLARK, SUPERINTENDENT.

The exhibition in this department, at the Annual Fair of 1876, was not a success; not so much on account of a lack of interest, as of the extremely bad weather. Quite a large number of persons who intended to exhibit fine wares were deterred for fear of injury to their property by the continued rains. Taking the weather into the account, and the exhibition was as full as could be expected.

Among the articles entitled to special mention is P. A. Johnston's Slate Stone Water Cooler.

In the line of hardware, each and all of the exhibitors presented so fine a display, that the judges found it very difficult to determine who were entitled to premiums.

Smith & Hopkins, and Schusta, Fitts & Paine, exhibited specimens of oil stoves worthy of commendation. C. A. Folsom & Co., and the Porter Oil Co., had both very fine displays of oil cans.

Otto Gweitusch was again on hand with his apparatus for mineral water, which was not only an attractive show, but was a great comfort to thirsty people.

O. L. Rosenkrans and the Racine Silver Plate Co., both added much to the attractive feature of the Fair, and are entitled to our thanks.

Messrs. Blair & Persons' display could not be beaten anywhere. A beautiful case of mathematical and philosophical instruments attracted much attention.

C. E. Andrews & Co., Milwaukee, are entitled to great credit for the labor bestowed to make the Fair a success. Their display of spices, coffee and baking powder, was one of the main attractions of the Fair.

The display of carriages was good.

The Berlin Woolen Mills exhibited a display of cloths, cassimeres, etc., they may justly be proud of.

The display of domestic manufactures was not at all up to the times.

The sewing machine department has always attracted much attention, and I regret that only one company exhibited. Wilcox & Gibbs refused to join in an agreement not to show, and their machines were surrounded by a crowd all the time. I carefully examined the "New Wilcox & Gibbs Automatic Sewing Machine," on exhibition, and found the following points of especial interest: The automatic tension, the feed, the feed surface, the stitch adjustment, the spool holder, its ease and quietness, its simplicity, and its superior finish. I regard it as the best machine for family use, and recommend for it a medal and honorable mention.

DEPARTMENT J.—FINE ARTS.

BY F. A. LYDSTON, SUPERINTENDENT.

The brief time intervening between my appointment, as superintendent of the Fine Arts Department, and the exhibition, rendered it impossible for me to realize to any great extent my desires to make the exhibition of that department, in every way worthy of the occasion. If our expectations were not fully realized on account of unforeseen difficulties, yet, I was so far successful by the aid of citizens of Milwaukee that I feel strongly encouraged in my hopes, that this department will become a distinctive and permanent branch of your society. In view of the fact that æsthetical culture is direct in the line of the advancement and well being of the whole people, and as the study of the Fine Arts has taken, of late years, a broad and liberal range in the education of the masses, it cannot but be regarded as a matter meriting attention. The exhibition of a painting wrought by the artistic hand, under the inspiration of genius, having for its subject, some grand and ennobling idea, cannot fail to produce in the mind of any intelligent observer ideas and emotions calculated to benefit his own life. Believing, as I do,

that art is a necessary part of popular education, and that fine specimens of the masters, too valuable to be within the ownership of many, may, by these art collections, be enjoyed by all, I beg in connection with this, my report, to submit some practical suggestions which may lead to the full accomplishment of the purposes for which this department has been established.

First. I would recommend that a direct invitation be extended to the artists of our own state, requesting a loan of one or more works of art for exhibition, and that suitable provisions be made for shipment of the same and return.

Secondly. That some painting of approved merit and popular interest, as a central exhibition, be procured at an expense above transportation and insurance, not exceeding \$50.

Thirdly. That the *money premium* be awarded to the artists exhibiting their own productions, and that collections of paintings of fifty or not less than twenty-five, regardless of the artist, receive some mark of approbation as a certificate or medal. To illustrate: *Fifty dollars* for the best original portrait in oil. *Twenty-five dollars* for the second best. Fifty dollars for the best original Landscape in oil, and twenty-five dollars for the second best. Fifty dollars for the best specimen of Marble Statuary, and twenty-five dollars for the second best. Twenty-five dollars for the best collection of photographs, and fifteen dollars for the second best.

Then for other works of art, give medals, diplomas, honorable mention, etc. Then have a department for the "coming man," the appreciative in each and every branch of "high art" which would excite competition, and your exhibition would be more interesting and satisfactory to all, and instead of having a lot of old paintings that have been seen year after year, you would have something new. I am satisfied that this department of Fine Arts, properly managed, will not only be remunerative, but at the same time will be creditable to your Agricultural Society, as well as to the state of Wisconsin.

The thanks of the Wisconsin State Agricultural Society, as well as myself, are due especially to Mrs. L. F. Hodges, Mrs. Alex. Mitchell, E. T. Mix, Esq., E. R. Persons, Esq., Hon. Geo. W. Allen and many other residents of Milwaukee for their aid, by furnishing valuable pictures for exhibition.

PREMIUMS AWARDED.

DEPARTMENT A.—HORSES.

CLASS 1.—*Thoroughbred.*

Best stallion 3 years old and under 4, C. Royce, Columbus.....	\$ 30 00
Best filly 3 years old and under 4, J. C. Corrigan, Cedarburg.....	15 00

CLASS 2.—*Roadsters.*

Best stallion 4 years and over, Richard Richards, Racine.....	50 00
Second best, Geo. Doubleday, Whitewater.....	25 00
Best stallion 3 years old and under 4, C. T. Bradley, Milwaukee	30 00
Second best, H. B. Roberts, Franksville.....	15 00
Best stallion 2 years old and under 3, C. Royce, Columbus.....	15 00
Second best, H. H. Greenman, Whitewater.....	10 00
Best stallion 1 year old and under 2, G. Nicholson, Oak Creek.....	10 00
Second best, John Ballack, Union Grove.....	5 00
Best sucking stallion foal, C. T. Bradley, Milwaukee.....	10 00
Second best, D. Whitehead, Milwaukee.....	5 00
Best brood mare 4 years old and over, with foal by side, Hugh Williams, Racine.....	30 00
Second best, C. T. Bradley, Milwaukee.....	15 00
Best filly 3 years old and under 4, Richard Richards, Racine.....	15 00
Second best, Richard Richards, Racine.....	10 00
Best filly 2 years old and under 3, C. T. Bradley, Milwaukee.....	10 00
Second best, Richard Richards, Racine	5 00
Best filly 1 year old and under 2, Richard Richards, Racine.....	10 00
Best sucking filly foal, John Ballack, Union Grove.....	10 00
Second best, Hugh Williams, Racine.	5 00

CLASS 3.—*Horses for General Purposes.*

Best stallion 5 years old and over, Thomas Irving, Mukwanago.....	\$30 00
Second best, Isaac Antony, Fond du Lac.....	15 00
Best stallion 3 years old and under 4, C. T. Bradley, Milwaukee.....	20 00
Second best, J. W. Thomas, Caledonia.....	10 00
Best stallion 2 years old and under 3, S. L. Harrington, Whitewater..	10 00
Second best, D. T. Pilgrim, West Granville.....	5 00
Best stallion 1 year old and under 2, Peter Michel, Franklin	8 00
Second best, J. D. Van Doren, Fisk's Corners....	4 00
Best sucking stallion foal, Jacob Fink, Oak Creek.....	5 00
Second best, J. D. Van Doren, Fisk's Corners.....	3 00
Best Brood mare with foal by side, E. & J. Smith, Rochester.....	20 00
Second best, Jacob Fink, Fond du Lac....	10 00
Best filly 3 years old and under 4, Richard Richards, Racine.....	15 00
Second best, D. T. Pilgrim, West Granville.....	10 00
Best filly 2 years old and under 3, Chas. F. Hackbarth, West Granville	10 00
Best filly 1 year old and under 2, R. Boyce & Son, Brooklyn.....	6 00
Second best, J. D. Van Doren, Fisk's Corners.....	3 00
Best sucking filly foal, R. Boyce & Son, Brooklyn.....	6 00

CLASS 4. — *Draft Horses.*

Best stallion 4 years old and over, H. B. Sherman, Milwaukee.....	\$30 00
Second best, Robt. Ogilvie, Madison.....	15 00
Best stallion 3 years old and under 4, Griffith Richards, Cambria.....	20 00
Second best, C. Royce, Columbus.....	10 00
Best stallion 2 years old and under 3, Richard Richards, Racine.....	10 00
Second best, J. D. Van Doren, Fisk's Corners.....	5 00
Best stallion 1 year old and under 2, Robt. Ogilvie, Madison.....	8 00
Second best, Robt. Ogilvie, Madison.....	4 00
Best sucking stallion foal, E. & J. Smith, Rochester.....	5 00
Second best, Wm. E. Lewis, Racine.....	3 00
Best brood mare with foal by her side, Robt. Ogilvie, Madison.....	20 00
Second best, Geo. Benning, Franklin.....	10 00
Best filly 3 years old and under 4, J. D. Van Doren, Fisk's Corners..	15 00
Best filly 2 years old and under 3, J. D. Van Doren, Fisk's Corners..	10 00
Best filly 1 year old and under 2, H. Ludington, Milwaukee.....	6 00
Second best, R. Boyce & Son, Brooklyn.....	3 00
Best sucking filly foal, Geo. Benning, Franklin.....	5 00
Second best, Geo. Benning, Franklin.....	3 00

CLASS 5. — *Matched Horses and Mares.*

Best pair carriage horses, J. F. Antisdell, Milwaukee.....	\$30 00
Second best, C. W. Walker, McGregor, Iowa.....	15 00
Best pair roadsters, A. L. Boynton, Milwaukee.....	30 00
Second best, Wm. Miller, Milwaukee.....	15 00
Best pair farm horses, Dexter Curtis, Madison.....	20 00
Second best, Robt. Ogilvie, Madison.....	10 00
Best pair draft horses, M. J. Haisler, Milwaukee.....	20 00
Second best, Dexter Curtis, Madison	10 00

CLASS 6. — *Gentleman's Roadster for Single Harness.*

Best gentleman's roadster for single harness, A. B. Medberry, Oshkosh	\$30 00
Second best, Richard Richards, Racine	15 00

CLASS 7. — *Sweepstakes on Horses,*

Best stallion and five colts, Richard Richards, Racine, silver plate...	\$100 00
Best brood mare with foal by her side, Hugh Williams, Racine, silver plate	50 00

CLASS 8. — *Horses for Speed.*

THREE MINUTE PURSE, \$700.

First, C. Daft, Chicago, "Damsel,"	\$400 00
Second, Jas. G. Clark, Oshkosh, "Ecrú Maid,"	200 00
Third, E. S. Hammond, Fond du Lac, "Tempest,"	100 00

TWO-FORTY PURSE — SPECIAL, \$500.

First, A. B. Medbury, Oshkosh, "Calvin B."	250 00
Second, Geo. Doubleday, Whitewater, "Hickory,"	150 00

FREE FOR ALL TROTTERS — SPECIAL, \$500.

First, A. A. Hammer, Madison, "Herod,"	250 00
Second, Stephen Bull, Racine, "Phil Sheridan,"	150 00
Third, Frank Boyd, Milwaukee, "Allen,"	100 00

TWO-FIFTY PURSE, \$700.

First, C. Daft, Chicago, "Damsel,".....	\$400 00
Second, Geo. Webber, Milwaukee, "Punch,".....	200 00
Third, W. F. Lee, Sparta, "Mackbeth,".....	100 00

DEPARTMENT B.—CATTLE.

CLASS 9.—*Short Horns.*

Best bull four years old and over, E. C. Lewis, Deer Park, Ills....	\$30 00
Second best, Eli Stilson, Oshkosh.....	20 00
Best bull three years old and under four, Eli Stilson, Oshkosh.....	30 00
Second best, James Webster, Danville.....	15 00
Best bull, raised by H. Ludington, Milwaukee, two years old and under three, P. McGeough, Milwaukee.....	30 00
Second best, Eli Stilson, Oshkosh.....	15 00
Best bull one year old and under two, Eli Stilson, Oshkosh.....	30 00
Second best, H. Ludington, Milwaukee.....	15 00
Best bull calf over six and under twelve months, Eli Stilson, Oshkosh.....	15 00
Second best, E. C. Lewis, Deer Park, Ills.....	10 00
Best bull calf under six months old, J. C. Kiser, Oregon.....	15 00
Second best, E. and J. Smith, Rochester.....	10 09
Best cow four years old and over, E. C. Lewis, Deer Park, Ills.....	25 00
Second best, E. C. Lewis, Deer Park, Ills.....	15 00
Best cow three years old and over, E. C. Lewis, Deer Park, Ills.....	25 00
Second best, E. C. Lewis, Deer Park, Ills.....	15 00
Best heifer two years old and under three, E. C. Lewis, Deer Park, Ills	25 00
Second best, E. and J. Smith, Rochester.....	15 00
Best heifer one year old and under two, E. C. Lewis, Deer Park, Ills.	25 00
Second best, Eli Stilson, Oshkosh.....	15 00
Best heifer calf over six and under twelve months old, Eli Stilson, Oshkosh.....	10 00
Second best, E. C. Lewis, Deer Park, Ills.....	5 00
Best heifer calf under six months old, J. C. Mitchem, Genesee.....	10 00
Second best, W. M. Ormond, Milwaukee.....	5 00

CLASS 10.—*Devons.*

Best bull three years old and over, Luther Rawson, Oak Creek.....	\$20 00
Second best, W. T. Smith, Elkhorn.....	10 00
Best bull two years old and under three, none awarded.....	.....
Second best, Michael Ferrick, Wauwatosa.....	10 00
Best bull one year old and under two, Luther Rawson, Oak Creek.....	20 00
Second best, W. T. Smith, Elkhorn.....	10 00
Best bull calf under twelve months old, W. T. Smith, Elkhorn.....	10 00
Second best, Luther Rawson, Oak Creek.....	5 00
Best cow three years old and over, W. T. Smith, Elkhorn.....	15 00
Second best, Luther Rawson, Oak Creek.....	10 00
Best heifer two years old and under three, Luther Rawson, Oak Creek.	15 00
Second best, W. T. Smith, Elkhorn.....	10 00
Best heifer one year old and under two, Luther Rawson, Oak Creek.	15 00
Second best, W. T. Smith, Elkhorn.....	10 00
Best heifer calf over six and under twelve months old, Luther Rawson, Oak Creek.....	6 00
Second best, Luther Rawson, Oak Creek.....	3 00
Best heifer calf under six months old, Luther Rawson, Oak Creek.....	6 00
Second best, Luther Rawson, Oak Creek.....	3 00

CLASS 11.—*Ayrshires.*

Best bull three years old and over, J. Johnson, Hartland.....	\$20 00
Second best, J. Stoddard, Greenbush.....	10 00
Best bull two years old and under three, no award.....	.....
Second best, J. Stoddard, Greenbush.....	10 00
Best bull one year old and under two, J. Stoddard, Greenbush.....	20 00
Second best, D. Huntley, Appleton.....	10 00
Best bull calf over six and under twelve months old, Carl Reese, Brookfield.....	10 00
Second best, J. Stoddard, Greenbush.....	5 00
Best bull calf under six months old, D. Huntley, Appleton.....	10 00
Second best, J. Johnson, Hartland.....	5 00
Best cow three years old and over, Jas. McNee, Emerald Grove.....	15 00
Second best, J. Johnson, Hartland.....	10 00
Best heifer two years old and under three, J. Johnson, Hartland.....	15 00
Second best, Chester Hazen, Ladoga.....	10 00
Best heifer one year and under two, Chester Hazen, Ladoga.....	15 00
Second best, J. Stoddard, Greenbush.....	10 00
Best heifer calf over six and under twelve months old, J. Johnson, Hartland.....	6 00
Second best, D. Huntley, Appleton.....	3 00
Best heifer calf under six months old, J. Johnson, Hartland.....	6 00
Second best, Chester Hazen, Ladoga.....	3 00

CLASS 12.—*Jerseys.*

Best bull three years old and over, Edmund King, Whitewater.....	\$20 00
Second best, H. S. Durand, Racine.....	10 00
Best bull one year old and under two, H. S. Durand, Racine.....	20 00
Second best, Fred Keebler, Menomonee Falls.....	10 00
Best bull calf over six and under twelve months old, H. S. Durand, Racine.....	10 00
Best bull calf under six months, H. S. Durand, Racine.....	10 00
Second best, H. S. Durand, Racine.....	5 00
Best cow three years old and over, H. S. Durand, Racine.....	15 00
Second best, H. S. Durand, Racine.....	10 00
Best heifer two years old and under three, H. S. Durand, Racine.....	15 00
Second best, H. S. Durand, Racine.....	10 00
Best heifer one year old and under two, H. S. Durand, Racine.....	15 00
Second best, O. G. Philbrook, Brookfield.....	10 00
Best heifer calf over six and under twelve months old, H. S. Durand, Racine.....	6 00
Second best, H. S. Durand, Racine.....	3 00
Best heifer calf under six months old, H. S. Durand, Racine.....	6 00

CLASS 13.—*Galloways.*

Best exhibition not less than six head, Peter Davy, Ashippun.....	60 00
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CLASS 14.—*Grade Short-Horns.*

Best cow four years old and over, E. and J. Smith, Rochester.....	\$15 00
Second best, E. and J. Smith, Rochester.....	10 00
Best cow three years old, E. and J. Smith, Rochester.....	15 00
Second best, O. L. Gridley, Wauwatosa.....	10 00
Best heifer two years old, E. and J. Smith, Rochester.....	15 00
Second best, E. and J. Smith, Rochester.....	10 00
Best yearling heifer, Eli Stilson, Oshkosh.....	15 00
Second best, E. and J. Smith, Rochester.....	10 00

Best heifer calf over six months old, E. and J. Smith, Rochester.....	\$6 00
Second best, E. and J. Smith, Rochester.....	3 00
Best heifer calf under six months old, E. and J. Smith, Rochester.	6 00
Second best, O. S. Gridley, Wauwatosa.....	3 00

CLASS 15. — *Grade Jerseys.*

Best cow three years old and over, Edmund King, Whitewater.....	\$15 00
Second best, Fred Keebler, Menomonee Falls.....	10 00
Best heifer two years old, Edmund King, Whitewater.....	15 00
Second best, Edmund King, Whitewater	10 00
Best yearling heifer, Edmund King, Whitewater.....	15 00
Second best, H. S. Durand, Racine.....	10 00

CLASS 16. — *Milch Cows.*

Best milch cow of any breed, four years old and over, M. L. Butterfield, Waukesha, silver plate.....	\$25 00
Second best, E. & J. Smith, Rochester, silver plate	15 00
Best milch cow of any breed three years old and under four, M. L. Butterfield, Waukesha, silver plate	25 00

CLASS 17. — *Fat Cattle and Working Oxen.*

Best pair working oxen, Luther Rawson, Oak Creek	\$20 00
Second best, Reuben Strong, Milwaukee	10 00

CLASS 18. — *Herds.*

SHORT HORNS.

Best bull and four cows or heifers over two years old, E. C. Lewis, Deer Park, Ill.....	\$100 00
Second best, Eli Stilson, Oshkosh.....	60 00

DEVONS.

Best bull and four cows or heifers over two years old, Luther Rawson, Oak Creek	\$50 00
Second best, W. T. Smith, Elkhorn	30 00

AYRSHIRES.

Best bull and four cows or heifers over two years old, J. Johnson, Hartland	\$50 00
Second best, J. Stoddard, Greenbush	30 00

JERSEYS.

Best bull and four cows or heifers over two years old, H. S. Durand, Racine	\$50 00
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SWEEPSTAKES.

Best bull of any age, raised by H. Ludington, Milwaukee, P. McGeough, Milwaukee.....	\$50 00
Second best, Eli Stilson, Oshkosh.....	30 00
Best cow or heifer of any age, E. C. Lewis, Deer Park, Ill.....	40 00
Second best, E. C. Lewis, Deer Park, Ill.....	20 00
Best cow and three of her calves owned by exhibitor, E. C. Lewis, Deer Park, Ill., silver plate.....	40 00
Best bull and three of his get owned by exhibitor, Eli Stilson, Oshkosh, silver plate	40 00

Best bull and four heifers under two years old, Eli Stilson, Oshkosh.	\$100 00
Second best, E. C. Lewis, Deer Park, Ill.	60 00
Best four calves bred and owned by exhibitor, Eli Stilson, Oshkosh.	40 00
Second best, Harding & Mitchem	30 00

DEPARTMENT C. — SHEEP.

CLASS 19. — *American Merinos.*

Buck two years old and over, G. Lawrence, Waukesha	\$20 00
Second, John H. Paul, Genesee.....	10 00
Buck one year old and under two, John H. Paul, Genesee.....	15 00
Second, G. Lawrence, Jr., Waukesha.....	10 00
Pen of three buck lambs, Geo. Lawrence, Jr., Waukesha.....	10 00
Second, John H. Paul, Genesee.....	5 00
Pen of ten ewes two years old and over, Geo. Lawrence, Jr., Waukesha	30 00
Second, John H. Paul, Genesee.....	15 00
Pen of three ewes two years old and over, Geo. Lawrence, Jr., Waukesha	20 00
Pen of ten ewes one year old and under two, John H. Paul, Genesee,	20 00
Second, C. M. Clark, Whitewater	15 00
Pen of three ewes one year old and under two, C. M. Clark, Whitewater	15 00
Second, Geo. Lawrence, Jr., Waukesha.....	10 00
Pen of ten ewe lambs, John H. Paul, Genesee.....	20 00
Second, Geo. Lawrence, Jr., Waukesha.....	10 00
Pen of three ewe lambs, Geo. Lawrence, Jr., Waukesha	10 00
Second, John H. Paul, Genesee.....	5 00
Best exhibition of sheep, John H. Paul, Genesee,.....	Dip.

SWEEPSTAKES.

Best buck with ten of his get and his cleansed fleece, John H. Paul, Genesee, silver plate.....	\$15 00
Second, Geo. Lawrence, Waukesha, silver plate.....	10 00

CLASS 20. — *Long Wool.*

Best buck two years old and over, Joseph O'Malley, Waunakee.....	\$20 00
Second, H. Rhodes, Hingham.....	10 00
Best buck one year old and under two, Joseph O'Malley, Waunakee.	15 00
Second, Geo. Harding, Waukesha.....	10 00
Best pen of three buck lambs, Geo. Harding, Waukesha.....	10 00
Second, Gould Bros., Stoughton	5 00
Best pen ten ewes two years old and over, S. A. Fox, Pewaukee.....	30 00
Second, Geo. Harding, Waukesha.....	15 00
Best pen three ewes two years old and over, S. A. Fox, Pewaukee...	20 00
Second, W. M. Ormond, Milwaukee.....	10 00
Best pen of ten ewes one year old and under two, S. A. Fox, Pewaukee	20 00
Second, Joseph O'Malley, Waunakee.....	10 00
Best pen of three ewes one year old and under two, Geo. Harding, Waukesha.....	15 00
Second, Geo. Harding, Waukesha.....	10 00
Best pen of ten ewe lambs, Geo. Harding, Waukesha.....	20 00
Second, Gould Bros., Stoughton	10 00
Best exhibition of sheep, S. A. Fox, Pewaukee.....	Dip.

CLASS 21. — *Downs.*

Best buck two years old and over, G. H. Daubner, Brookfield Center	\$20 00
Second, Luther Rawson, Oak Creek.....	10 00
Best buck one year old and under two, G. H. Daubner, Brookfield Center	15 00
Second, Luther Rawson, Oak Creek.....	10 00
Best pen three buck lambs, G. H. Daubner, Brookfield Center.....	10 00
Second, Luther Rawson, Oak Creek.....	5 00
Best pen three ewes two years old and over, G. H. Daubner, Brookfield Center.....	20 00
Second, Luther Rawson, Oak Creek.....	10 00
Best pen of three ewes one year old and under two, G. H. Daubner, Brookfield Center.....	15 00
Second, Luther Rawson, Oak Creek.....	10 00
Best pen of three ewe lambs, G. H. Daubner, Brookfield Center	10 00
Second, Luther Rawson, Oak Creek.....	5 00
Best exhibition of sheep, G. H. Daubner, Brookfield Center	Dip.

DEPARTMENT D. — SWINE.

CLASS 22. — *Large Breeds, Poland Chinas, Chester Whites, and others.*

Best boar two years and over, W. W. Ellsworth, Woodstock, Ill.....	\$15 00
Second best, W. W. Woodward, Good Hope	10 00
Best boar one year and under two, W. W. Ellsworth, Woodstock, Ill.	10 00
Second best, R. Boyce & Son, Brooklyn	5 00
Best breeding sow, two years and over, W. W. Ellsworth, Woodstock, Illinois.....	15 00
Second best, W. W. Ellsworth, Woodstock, Ill.....	10 00
Best breeding sow one year and under two, W. W. Ellsworth, Woodstock, Ill	10 00
Second best, S. I. Hook, Oregon	5 00
Best breeding sow with pigs, not less than four, R. Boyce & Son, Brooklyn.....	15 00
Second best, L. K. Cogswell, Beloit	10 00
Best boar pig six months and under one year, W. W. Ellsworth, Woodstock, Ill	8 00
Second best, R. Boyce & Son, Oregon.....	4 00
Best sow pig, six months and under one year, R. Boyce & Son, Oregon	8 00
Second best, H. S. Haylett, Menominee Falls.....	4 00
Best boar pig under six months, W. W. Ellsworth, Woodstock, Ill..	8 00
Second best, under six months, W. W. Ellsworth, Woodstock, Ill....	8 00
Best sow pig under six months, W. W. Ellsworth, Woodstock, Ill...	8 00
Second best, Rodney Seaver, Darien.....	4 00

MIDDLE BREEDS, INCLUDING BERKSHIRES.

Best boar two years and over, Robert Ogilvie, Madison.....	\$15 00
Second best, H. S. Durand, Racine.....	10 00
Best boar one year and under two, James Magson, Walworth.....	10 00
Second best, J. C. Mitchem, Genesee	5 00
Best breeding sow, two years and over, James Magson, Walworth...	15 00
Second best, Gould Bros., Stoughton.....	10 00
Best breeding sow one year and under two, J. C. Mitchem, Genesee..	10 00

Second best, James Magson, Walworth.....	\$5 00
Best breeding sow with litter of pigs not less than four... ..	15 00
Second best, Gould Bros., Stoughton.....	10 00
Best boar pig six months and under one year, Robert Ogilvie, Madison	8 00
Second best, J. C. Mitchem, Genesee	4 00
Best sow pig six months and under one year, H. S. Durand, Racine..	8 00
Second best, James Magson, Walworth.....	4 00
Best boar pig, under six months, J. C. Mitchem, Genesee.....	8 00
Second best, James Magson, Walworth.....	4 00
Best sow pig under six months, J. C. Mitchem, Genesee	8 00
Second best, James Magson, Walworth.....	4 00

SMALL BREEDS, ESSEX, SUFFOLK AND OTHERS.

Best boar one year and under two, J. D. Van Doren, Fisk's Corners.	\$10 00
Second best, John Jeffers, Darien.....	5 00
Best breeding sow, two years and over, John Jeffers, Darien.....	15 00
Second best, J. D. Van Doren, Fisk's Corners.....	10 00
Best breeding sow one year and under two, J. D. Van Doren, Fisk's Corners	10 00
Second best, John Jeffers, Darien.....	5 00
Best breeding sow, with pigs not less than four, John Jeffers, Darien.	15 00
Second best, Geo. P. Pfeffer, Pewaukee.....	10 00
Best boar pig six months and under one year, John Jeffers, Darien..	8 00
Second best, J. D. Van Doren, Fisk's Corners.....	4 00
Best sow pig six months and under one year, J. D. Van Doren, Fisk's Corners	4 00
Second best, John Jeffers, Darien.....	4 00
Best boar pig under six months, John Jeffers, Darien.....	8 00
Second best, J. D. Van Doren, Fisk's Corners.....	4 00
Best sow pig under six months, John Jeffers, Darien.....	8 00
Second best, Geo. P. Pfeffer, Pewaukee	4 00

SPECIAL PREMIUMS OFFERED BY MESSRS. PLANKINTON & ARMOUR AND LAY-
TON & CO., PORK PACKERS, MILWAUKEE.

Best boar of any age, Robert Ogilvie, Madison.....	\$25 00
Best sow, S. I. Hook, Oregon.....	25 00
Best six pigs under eight months. H. S. Haylett, Menominee Falls...	10 00
Best boar and sow of any age and breed with five pigs not over six months, H. S. Durand, Racine.....	40 00

DEPARTMENT E. — POULTRY.

CLASS 23.

Best trio Light Brahmas, Leon Howard, Milwaukee.....	\$2 50
Second best, P. A. Van Vrankin, Wauwatosa	1 50
Best trio Dark Brahmas, Leon Howard, Milwaukee.....	2 50
Second best, A. E. Brown, Oconomowoc.....	1 50
Best trio Buff Cochins, Leon Howard, Milwaukee.....	2 50
Second best, Leon Howard, Milwaukee	1 50
Best trio Partridge Cochins, H. D. Gardner, Milwaukee	2 50
Second best, P. A. Van Vrankin, Wauwatosa.....	1 50
Best trio Brown Red Game, H. D. Gardner, Milwaukee.....	2 50
Best trio B. B. Red Game, H. D. Gardner, Milwaukee.....	2 50
Second best, E. P. Richardson, Milwaukee	1 50

Best trio Pyle, E. P. Richardson, Milwaukee.....	\$2 50
Second best, E. P. Richardson, Milwaukee.....	1 50
Best trio game any variety, H. D. Gardner, Milwaukee.....	2 50
Best trio Plymouth Rocks, J. B. Judson, Milwaukee	2 50
Second best, J. B. Judson, Milwaukee.....	1 50
Best trio Black Spanish, H. D. Gardner, Milwaukee	2 50
Second best, H. D. Gardner, Milwaukee.....	1 50
Best trio White Leghorns, H. D. Gardner, Milwaukee.....	2 50
Second best, H. D. Gardner, Milwaukee	1 50
Best trio Brown Leghorns, Wm. I. Lane, Milwaukee	2 50
Second best, Wm. I. Lane, Milwaukee	1 50
Best trio Houdans, P. A. Van Vrankin, Wauwatosa.....	2 50
Second best, P. A. Van Vrankin, Wauwatosa....	1 50
Best trio Golden Seabright, P. A. Van Vrankin, Wauwatosa.....	2 50
Best trio White Polish, H. D. Gardner, Milwaukee.....	2 50
Best trio B. B. Red Game Bantams, A. E. Brown, Oconomowoc.....	2 50
Best trio Silver Duckwing, P. A. Van Vrankin, Wauwatosa	2 50
Second best, P. A. Van Vrankin, Wauwutosa.....	1 50
Best pair Aylesburg Ducks, P. A. Van Vrankin, Wauwatosa.....	2 50
Second best, P. A. Van Vrankin, Wauwatosa.....	1 50
Best pair Rouen Ducks, P. A. Van Vrankin, Wauwautosa.....	1 50
Second best, P. A. Van Vrankin, Wauwutosa.....	1 50
Best and greatest variety shown by one person, P. A. Van Vrankin, Wauwatosa	Silver plate 10 00

DEPARTMENT F. — AGRICULTURE.

CLASS 24. — *Field Products.*

Best spring wheat, (club), Chris. Lunhardt, Sturgeon Bay.....	\$7 00
Second best, (Odessa), Chas. Moffatt, Hartford.....	4 00
Best spring wheat, (fife), D. T. Pilgrim, West Granville.....	7 00
Second best, Geo. Jeffery, Smithville.....	4 00
Best white winter wheat, D. T. Pilgrim, West Granville.....	7 00
Best rye, J. B. Johnson, Wauwatosa.....	5 00
Second best, D. T. Pilgrim, West Granville.....	3 00
Best white oats, D. T. Pilgrim, West Granville.....	5 00
Second best, Geo. Jeffery, Smithville.....	3 00
Best black oats, D. T. Pilgrim, West Granville.....	5 00
Best barley, D. T. Pilgrim, West Granville.....	5 00
Second best, Geo. Jeffery, Smithville.....	3 00
Best buckwheat, D. T. Pilgrim, West Granville.....	5 00
Best flax seed, Geo. Jeffery, Smithville.....	5 00
Second best, D. T. Pilgrim, West Granville.....	3 00
Best sack hops, D. T. Pilgrim, West Granville.....	5 00
Best timothy seed, D. T. Pilgrim, West Granville.....	5 00
Second best, Geo. Jeffery, Smithville.....	3 00
Best clover seed, Geo. Jeffery, Smithville.....	5 00
Second best, D. T. Pilgrim, West Granville.....	3 00
Best peas, D. T. Pilgrim, West Granville.....	5 00
Second best, Geo. Jeffery, Smithville..	3 00
Best beans, D. T. Pilgrim, West Granville.....	5 00
Second best, Geo. Jeffery, Smithville.....	3 00
Best yellow dent corn, Eddie H. Park, Dodge's corners.....	5 00
Second best, P. Dutnam, Dodge's Corners.....	3 00
Best white flint corn, P. Putnam, Dodge's Corners....	5 00
Second best, D. T. Pilgrim, West Granville.....	3 00
Best yellow flint corn, D. T. Pilgrim, West Granville.....	5 00

SPECIAL PREMIUMS.

Best bushel winter wheat, D. T. Pilgrim, West Granville.....	\$25 00
Best bushel spring wheat, D. T. Pilgrim, West Granville.....	25 00
Best exhibition field products, D. T. Pilgrim, West Granville, silver plate	25 00
Second best, Geo. Jeffery, Smithville, silver plate.....	15 00

CLASS 25. — *Garden and Vegetable Produce.*

Best early rose potatoes, J. M. Smith, Green Bay.....	\$3 00
Second best, D. T. Pilgrim, West Granville....	2 00
Best other variety early potatoes, D. Huntley, Appleton.....	3 00
Second best, Mrs. F. M. Vilas, Madison.....	2 00
Best half bushel peachblows, D. T. Pilgrim, West Granville.....	3 00
Best other variety late potatoes, Geo. Jeffery, Smithville.....	3 00
Second best, Eddie H. Park, Dodge's Corners.....	2 00
Best red Bermuda sweet potatoes, J. W. Smith, Green Bay.....	3 00
Best four quarts Lima beans, Eddie H. Park, Dodge's Corners.....	3 00
Second best, James Lewis, Oshkosh.....	2 00
Best blood turnip beet, J. M. Smith, Green Bay.....	3 00
Second best, James Lewis, Oshkosh.....	2 00
Best long blood beets, J. M. Smith, Green Bay.....	3 00
Second best, James Lewis, Oshkosh.....	2 00
Best mangel wurzel, Jas. Lewis, Oshkosh.....	3 00
Second best, J. M. Smith, Green Bay.....	2 00
Best red Wethersfield onions, James Lewis, Oshkosh.....	3 00
Second best, J. M. Smith, Green Bay.....	2 00
Best yellow Danvers onions, Jas. Lewis, Oshkosh.....	3 00
Second best, J. M. Smith, Green Bay.....	2 00
Best other variety onions, James Lewis, Oshkosh.....	3 00
Second best, James Lewis, Oshkosh.....	2 00
Best drum head cabbage, J. M. Smith, Green Bay....	3 00
Second best, L. Tiemer, Milwaukee.....	2 00
Best Winningstadt cabbage, L. Tiemer, Milwaukee.....	3 00
Second best, James Lewis, Oshkosh.....	2 00
Best long orange carrots, James Lewis, Oshkosh....	3 00
Second best, J. M. Smith, Green Bay.....	2 00
Best horn Carrots, James Lewis, Oshkosh.....	3 00
Second best, Geo. Jeffery, Smithville.....	2 00
Best head cauliflower, G. W. Ringrose.....	3 00
Second best, C. J. Richards, Milwaukee.....	2 00
Best ten heads celery, James Lewis, Oshkosh.....	3 00
Second best, J. M. Smith, Green Bay.....	2 00
Best twelve ears late sweet corn, James Lewis, Oshkosh.....	3 00
Second best, James Lewis, Oshkosh.....	2 00
Best sample egg plant, J. M. Smith, Green Bay... ..	2 00
Second best, James Lewis, Oshkosh.....	1 00
Best six watermelons, P. Putnam, Dodge's Corners.....	3 00
Second best, Eddie H. Park, Dodge's Corners....	2 00
Best six nutmeg melons, J. M. Smith, Green Bay.....	3 00
Second best, Eddie H. Park, Dodge's Corners.....	2 00
Best parsnips, J. M. Smith, Green Bay.....	3 00
Second best, James Lewis, Oshkosh.....	2 00
Best twelve red Peppers, G. W. Ringrose.....	2 00
Second best, James Lewis, Oshkosh.....	1 00
Best vegetable oysters, D. T. Pilgrim, West Granville.....	2 00
Second best, S. B. Smith, Dodge's Corners.....	1 00
Best six Hubbard squashes, James Lewis, Oshkosh.....	3 00
Second best, L. Tiemer, Milwaukee.....	2 00
Best large squash of any variety, James Lewis, Oshkosh.....	3 00
Second best, D. T. Pilgrim, West Granville.....	2 00

Best tomatoes, James Lewis, Oshkosh.....	\$3 00
Second best, J. M. Smith, Green Bay.....	2 00
Best flat turnips, J. M. Smith, Green Bay.....	3 00
Second best, Geo. Jeffery, Smithville.....	2 00
Best rutabagas, S. B. Smith, Dodge's Corners.....	3 00
Second best, L. Tiemer, Milwaukee.....	2 00
Best exhibition by one exhibitor, James Lewis, Oshkosh.....	15 00
Second best, G. W. Ringrose.....	10 00
Third best, S. B. Smith, Dodge's Corners.....	5 00

CLASS 26. — *Products of the Flouring Mill, Dairy and Apiary.*

Best barrel spring wheat flour, E. Sanderson & Co., Milwaukee	Silver Plate, \$15 00
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BUTTER — FARM MADE.

Best twenty pounds made in May, F. C. Curtis, Rocky Run.....	\$15 00
Second best, J. Stoddard, Greenbush	10 00
Best twenty pounds made in June, F. C. Curtis, Rocky Run.....	15 00
Second best, J. Stoddard, Greenbush.....	10 00
Third best, P. Putnam, Dodge's Corners.....	5 00
Best twenty pounds made in July, D. W. Vale, Whitewater	15 00
Second best, D. W. Vale, Whitewater	10 00
Third best, F. C. Curtis, Rocky Run.....	5 00

Sweepstakes.

Best sixty pounds, twenty pounds made in each of the months named, F. C. Curtis, Rocky Run	Silver Medal
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BUTTER — CREAMERY.

Best twenty pounds made in May, Robert Thomas	\$15 00
Second best, R. H. Houston, Kenosha.....	10 00
Third best, H. S. Durand, Racine	5 00
Best twenty pounds made in June, J. J. Smith & Sons, Tomah.....	15 00
Second best, R. H. Houston, Kenosha.....	10 00
Third best, H. S. Durand, Racine	5 00
Best twenty pounds made in July, J. J. Smith & Sons, Tomah.....	15 00
Second best, Robert Thomas.....	10 00
Third best, H. S. Durand, Racine ..	5 00

Sweepstakes.

Best sixty pounds, twenty pounds made in each of the months named, J. J. Smith & Sons, Tomah.....	Silver Medal
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CHEESE.

Best two cheese made June 5th to 15th, C. Gibson, Lind.....	\$20 00
Second best, H. Conover, Plymouth	15 00
Third best, H. R. Hubbard, Woodworth.....	10 00
Fourth best, Cheever & Pierce, Clinton.....	5 00
Best two cheese made July 5th to 15th, C. Gibson, Lind.....	20 00
Second best, Hiram Conover, Plymouth.....	15 00
Third best, A. H. Wheaton, Auroraville	10 00
Fourth best, M. N. Seward, Lake Mills.....	5 00
Best two cheese made August 5th to 15th, Smith & Gates, Sheboygan Falls	20 00
Second best, C. Gibson, Lind	15 00
Third best, M. N. Seward, Lake Mills.....	10 00
Fourth best, Hiram Conover, Plymouth	5 00

PRIVATE DAIRY.

Best two cheese made at any time, N. Coffin, Lamartine..... \$15 00

Sweepstakes.

Best six cheese, two made in each of the above named months, C.
Gibson, Lind Silver Medal.

SAMPLES OF HONEY AND SUGAR.

Best ten pounds honey, Louis Matties, Wauwatosa..... \$10 00
Second best, J. B. Cross, Milwaukee..... 5 00
Best extracted honey, A. H. Hart, Appleton 5 00
Best Honey Extractor, A. H. Hart, Appleton..... 3 00
Best method of handling bees, A. H. Hart, Appleton..... 10 00
Best Italian bees, A. H. Hart, Appleton..... 5 00

CLASS 27. — *Household Products.*

Best two loaves graham bread, Mrs. C. H. Root, Ripon..... \$3 00
Best two loaves white bread, hop yeast, Mrs. Sally Bell, Greenfield... 3 00
Best two loaves indian bread, Mrs. C. H. Root, Ripon..... 3 00
Best sponge cake, H. S. Durand, Racine..... 2 00
Best pound cake, Mrs. C. H. Root, Ripon..... 2 00
Best jelly cake, Mrs. C. H. Root, Ripon 2 00
Best gold and silver cake, Mrs. C. H. Root, Ripon 2 00
Best fruit cake, Mrs. C. H. Root, Ripon 2 00
Best and largest exhibition, Mrs. C. H. Root, Ripon..... Silver Medal.

SEALED AND PRESERVED FRUITS AND PICKLES.

Best canned peaches, C. J. Richards, Milwaukee Silver Plate, \$2 00
Best canned plums, C. J. Richards, Milwaukee..... Silver Plate, 2 00
Best canned currants, S. B. Smith, Dodge's Corners Silver Plate, 2 00
Best canned tomatoes, Mrs. C. H. Root, Ripon..... Silver Plate, 2 00
Best canned gooseberries, Mrs. C. H. Root, Ripon Silver Plate, 2 00
Best canned raspberries, Merial L. Park, Dodge's Corners, Silver Plate, 2 00
Best canned strawberries, Mrs. C. H. Root, Ripon Silver Plate, 2 00
Best preserved peaches, C. J. Richards, Milwaukee..... Silver Plate, 2 00
Best preserved plums, Mrs. C. H. Root, Ripon... Silver Plate, 2 00
Best preserved watermelon, Mrs. C. H. Root, Ripon Silver Plate, 2 00
Best preserved grapes, S. B. Smith, Dodge's Corners..... Silver Plate, 2 00
Best apple butter, Merial L. Park, Dodge's Corners Silver Plate, 2 00
Best raspberry jam, Merial L. Park, Dodge's Corners.... Silver Plate, 2 00
Best sour pickled cucumbers, H. S. Durand, Racine..... Silver Plate, 2 00
Best pickled mangoes, Mrs. J. A. Smith, Milwaukee... Silver Plate, 2 00
Best pickled peaches, Mrs. C. H. Root, Ripon Silver Plate, 2 00
Best pickled pears, S. B. Smith, Dodge's Corners..... Silver Plate, 2 00
Best tomato catsup, Mrs. C. H. Root, Ripon..... Silver Plate, 2 00
Best and largest exhibition of articles above specified,
Mrs. C. H. Root, Ripon..... Silver Plate, 5 00

DEPARTMENT G.—FRUITS AND FLOWERS.

CLASS 28. — *Fruits by Professional Cultivators.*

Best display of varieties not to exceed 50, Gould Nursery, Beaver Dam. \$10 00
Second best, Leonard L. Kellogg, Janesville..... 7 50

Third best, Geo. P. Pfeffer, Pewaukee.....	\$5 00
Best 10 varieties adapted to the Northwest, Geo. P. Pfeffer, Pewaukee,	10 00
Second best, Leonard L. Kellogg, Janesville.....	7 50
Third best, William Reid, North Prairie.....	5 00
Best 5 varieties adapted to the Northwest, L. L. Kellogg, Janesville..	5 00
Second best, N. N. Palmer, Brodhead.....	3 00
Third best, Wm. Reid, North Prairie,.....	2 00

LARGE VARIETY, NOT TO EXCEED TWENTY, OF WINTER APPLES.

First best, L. L. Kellogg, Janesville.....	\$5 00
Second best, N. N. Palmer, Brodhead.....	3 00
Third best, Wm. Reid, North Prairie.....	2 00

FIVE VARIETIES OF WINTER APPLES.

First best, Wm. Reid, North Prairie... ..	\$5 00
Second best, F. W. Loudon, Janesville.....	3 00
Third best, Wm. Finlayson, Mazomanie.....	2 00

TEN VARIETIES WITHOUT REGARD TO ADAPTATION.

First best, Geo. P. Pfeffer, Pewaukee.....	\$5 00
Second best, L. L. Kellogg, Janesville.....	3 00
Third best, Gould Nursery, Beaver Dam.....	2 00
Plate Red Astrachan, Gould Nursery, Beaver Dam..	1 00
Plate Duchess of Oldenberg, L. L. Kellogg, Janesville.....	1 00
Plate St. Lawrence, N. N. Palmer, Brodhead.	1 00
Plate Fameuse, F. W. Loudon, Janesville.....	1 00
Plate Utters, F. W. Loudon, Janesville.....	1 00
Plate Plumb's Cider, Wm. Reid, North Prairie.	1 00
Plate Seek-no-further, Wm. Reid, North Prairie.....	1 00
Plate Willow Twig, N. N. Palmer, Brodhead.....	1 00
Plate Ben Davis, Wm. Finlayson, Mazomanie.....	1 00
Plate Tallman's Sweet, Wm. Reid, North Prairie.....	1 00
Plate Russett, N. N. Palmer, Brodhead.....	1 00
Largest apple, Geo. P. Pfeffer, Pewaukee.....	1 00
Heaviest apple, Geo. P. Pfeffer, Pewaukee.....	1 00

PEARS.

Best and greatest display of varieties, Geo. P. Pfeffer, Pewaukee.....	\$5 00
Second best, Gould Nursery, Beaver Dam.....	4 00
Third best, F. W. Loudon, Janesville	2 00
Best 5 varieties, Geo. P. Pfeffer, Pewaukee.....	3 00
Second best, Gould Nursery, Beaver Dam.....	2 00
Best 3 varieties, Gould Nursery, Beaver Dam.....	3 00
Second best, Geo. P. Pfeffer, Pewaukee.....	2 00
Best Flemish Beauty, Geo. P. Pfeffer.....	3 00
Second best, Gould Nursery, Beaver Dam.....	2 00

PLUMS.

Best and largest variety, Geo. P. Pfeffer, Pewaukee..	\$5 00
Second best, L. Ziemer, Milwaukee.....	3 00
Best Miner, Geo. P. Pfeffer, Pewaukee.....	2 00
Second best, Wm. Finlayson, Mazomanie.....	1 00
Best native or wild plum, Geo. P. Pfeffer, Pewaukee.....	2 00
Second best, Wm. Reid, North Prairie.....	1 00

CLASS 29.—*Grapes and Crabs, by Professional Cultivators.*

GRAPES.

Best and greatest display of varieties, L. L. Kellogg, Janesville.....	\$10 00
Second best, Wm. Reid, North Prairie.....	7 50

Third best, Geo. P. Peffer, Pewaukee.....	\$5 00
Best 10 varieties, Wm. Reid, North Prairie.....	7 50
Second best, L. L. Kellogg, Janesville.....	5 00
Third best, F. W. Loudon, Janesville.....	3 00
Best 5 varieties, C. H. Greenman, Milton.....	5 00
Second best, F. W. Loudon, Janesville.....	3 00
Third best, N. N. Palmer, Brodhead..	2 00
Best 3 varieties, L. L. Kellogg, Janesville.....	3 00
Second best, C. H. Greenman, Milton.....	2 00
Third best, Wm. Finlayson, Mazomanie.....	1 00
Best 2 varieties, L. L. Kellogg, Janesville.....	2 00
Second best, N. N. Palmer, Brodhead.....	1 00
Single variety, C. H. Greenman, Milton.....	3 00
Second best, Wm. Reid, North Prairie.....	2 00
Three bunches Concord on one cane, Wm. Reid, North Prairie.....	2 00
Second best C. H. Greenman, Milton.....	1 00
Three bunches Delaware on one cane, Wm. Reid, North Prairie.....	2 00
Second best, L. L. Kellogg, Janesville.....	1 00
Best single variety as to quality, L. L. Kellogg, Janesville.....	3 00
Second best, C. H. Greenman, Milton.....	2 00
Best show foreign, Geo. P. Peffer, Pewaukee.....	3 00

CRABS.

Best and greatest variety named, Gould Nursery, Beaver Dam.....	\$3 00
Second best, Geo. P. Peffer, Pewaukee.....	2 00
Third best, Wm. Finlayson, Mazomanie.....	1 00
Best plate Hyslop, C. H. Greenman, Milton.....	1 00
Best plate Transcendent, Wm. Finlayson, Mazomanie.....	1 00
Best seedling crab, Geo. P. Peffer, Pewaukee.....	2 00
Second best, Wm. Finlayson, Mazomanie.....	1 00

Sweepstakes.

Best collection of fruits of all kinds, Geo. P. Peffer, Pewaukee.....	\$7 50
Second best, L. L. Kellogg, Janesville.....	5 00
Third best, Wm. Reid, North Prairie.....	3 00

CLASS 30. — *Fruits by non-professional Cultivators.*

APPLES.

Best and greatest variety not more than 50, G. W. Ringrose, Wauwatosa.....	\$10 00
Second best, B. B. Olds, Clinton.....	7 50
Third best, Geo. Jeffery, Smithville.....	5 00
Best 10 varieties adapted to northwest, D. Huntley, Appleton.....	10 00
Second best, E. D. Lewis, Lake Mills.....	7 50
Third best, D. T. Pilgrim.....	5 00
Best 10 varieties without regard to adaptation, E. B. Thomas, Dodge's Corners.....	5 00
Second best, James Ozanne, Somers.....	3 00
Third best, Fred Keebler, Menomonee Falls.....	2 00
Best 5 varieties adapted to Northwest, James Ozanne, Somers.....	5 00
Second best, E. D. Lewis, Lake Mills.....	3 00
Third best, E. B. Thomas, Dodge's Corners.....	2 00
Best and largest variety winter, L. Woodworth, Woodworth....	5 00
Second best, J. W. Park, Dodge's Corners.....	3 00
Third best, E. H. Benton, LeRoy.....	2 00
Best 5 varieties winter, J. B. Johnson, Wauwatosa.....	5 00
Second best, James Ozanne, Somers.....	3 00
Third best, G. W. Ringrose, Wauwatosa.....	2 00
Best plate Red Astrachan, D. Huntley, Appleton.....	1 00
Best plate Duchess of Oldenberg, J. B. Johnson, Wauwatosa.....	1 00

Best plate Fameuse, Geo. Jeffery, Smithville	\$1 00
Best plate St. Lawrence, L. Ranson, Oak Creek	1 00
Best plate Utter's, F. C. Curtis, Rocky Run	1 00
Best plate Plumb's Cider, F. C. Curtis, Rocky Run	1 00
Best plate Seek-no-further, E. H. Benton, LeRoy	1 00
Best plate Tallman Sweet, E. B. Thomas, Dodge's Corners	1 00
Best plate Golden Russet, J. W. Park, Dodge's Corners	1 00
Best plate Willow Twig, E. D. Lewis, Lake Mills	1 00
Best plate Ben Davis, B. B. Olds, Clifton	1 00
Largest apple, Wm. Wallace, Sussex	1 00
Heaviest apple, Wm. Wallace, Sussex	1 00

PEARS.

Best and greatest varieties, E. B. Thomas, Dodge's Corners	\$5 00
Second best, J. W. Park, Dodge's Corners	4 00
Third best, James Ozanne, Somers	2 00
Best 5 varieties, James Ozanne, Somers	3 00
Second best, Geo. Jeffery, Smithville	2 00
Third best, G. W. Ringrose, Wauwatosa	1 00
Best 3 varieties, D. T. Pilgrim, West Granville	3 00
Second best, J. W. Park, Dodge's Corners	2 00
Best Flemish Beauty, D. T. Pilgrim, West Granville	3 00
Second best, Geo. Jeffery, Smithville	2 00

PLUMS.

Best and greatest variety, Geo. Jeffery, Smithville	\$5 00
Second best, D. T. Pilgrim, West Granville	3 00

CLASS 31.—*Grapes and Crabs by Non-Professional Cultivators.*

GRAPES.

Best and greatest variety, V. Lowe, Palmyra	\$10 00
Second best, F. S. Lawrence, Janesville	7 50
Third best, E. D. Lewis, Lake Mills	5 00
Best 10 varieties, V. Lowe, Palmyra	7 50
Second best, F. S. Lawrence, Janesville	5 00
Third best, E. B. Thomas, Dodge's Corners	3 00
Best 5 varieties, V. Lowe, Palmyra	5 00
Second best, J. W. Park, Dodge's Corners	3 00
Third best, E. B. Thomas, Dodge's Corners	2 00
Best 3 varieties, V. Lowe, Palmyra	3 00
Second best, E. B. Thomas, Dodge's Corners	2 00
Third best, F. S. Lawrence, Janesville	1 00
Best 2 varieties, E. B. Thomas, Dodge's Corners	2 00
Second best, F. S. Lawrence, Janesville	1 00
Best single variety, F. S. Lawrence, Janesville	3 00
Second best, E. B. Thomas, Dodge's Corners	2 00
Best 3 bunches Concord on one cane, V. Lowe, Palmyra	2 00
Second best, J. W. Park, Dodge's Corners	1 00
Best 3 bunches Delaware on one cane, V. Lowe, Palmyra	2 00
Second best, J. W. Park, Dodge's Corners	1 00
Best single variety, quality to rule, V. Lowe, Palmyra	3 00
Second best, J. W. Park, Dodge's Corners	2 00

CRABS.

Best and greatest variety named, D. T. Pilgrim, West Granville	\$3 00
Second best, Geo. Jeffery, Smithville	2 00
Third best, E. D. Lewis, Lake Mills	1 00
Best plate Hyslop, G. W. Ringrose, Wauwatosa	1 00
Best plate Transcendent, D. T. Pilgrim, West Granville	1 00
Best seedling crab, E. H. Benton, LeRoy	2 00

Sweepstakes.

Best collection of all kinds, James Ozanne, Somers	\$7 50
Second best, G. W. Ringrose, Wauwatosa	5 00
Third best, Geo. Jeffery, Smithville	3 00

CLASS 32. — *Seedlings.*

Best seedling apple, F. W. Loudon, Janesville	Dip or \$10 00
Second best, L. L. Kellogg, Janesville	5 00
Third best, Wm. Finlayson, Mazomanie	3 00

CLASS 34. — *Summer Fruits.*

Best collection evergreens, H. M. Thompson & Son, St. Francis	Dip.
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CLASS 35. — *Flowers, by Professional Cultivators.*

Best floral design, Wm. Kitzrow, Milwaukee	\$7 50
Second best, Miss Kate Pfeffer, Pewaukee	3 00
Best collection cut flowers, Wm. Kitzrow, Milwaukee	4 00
Second best, Miss Kate Pfeffer, Pewaukee	3 00
Best basket of flowers, Wm. Kitzrow, Milwaukee	3 00
Best pyramidal bouquet, Miss Kate Pfeffer, Pewaukee	3 00
Second best, Wm. Kitzrow, Milwaukee	2 00
Best pair round bouquets, Wm. Kitzrow, Milwaukee	3 00
Second best, Miss Kate Pfeffer, Pewaukee	2 00
Best pair flat bouquets, Wm. Kitzrow, Milwaukee	2 00
Best bouquet everlasting flowers, Wm. Kitzrow, Milwaukee	3 00
Best display dahlias, Miss Kate Pfeffer, Pewaukee	3 00
Best 10 named dahlias, Miss Kate Pfeffer, Pewaukee	2 00
Best display roses, Wm. Kitzrow, Milwaukee	4 00
Best 5 named varieties roses, Wm. Kitzrow, Milwaukee	3 00
Best display verbenas, Miss Kate Pfeffer, Pewaukee	2 00
Second best, Wm. Kitzrow, Milwaukee	1 00
Best 10 varieties verbenas, Wm. Kitzrow, Milwaukee	2 00
Second best, Miss Kate Pfeffer, Pewaukee	1 00
Best show seedling verbenas, Wm. Kitzrow, Milwaukee	2 00
Best show asters, Wm. Kitzrow, Milwaukee	2 00
Best show perennial phlox, Miss Kate Pfeffer, Pewaukee	1 00
Second best, Wm. Kitzrow, Milwaukee	50
Best show petunias, Wm. Kitzrow, Milwaukee	1 00
Best show dianthus (pink) Wm. Kitzrow, Milwaukee	1 00
Best show gladiolis, Wm. Kitzrow, Milwaukee	1 00
Second best, Miss Kate Pfeffer, Pewaukee	50
Best show phlox, drummondii, Miss Kate Pfeffer, Pewaukee	1 00
Second best, Wm. Kitzrow, Milwaukee	50
Best show tube rose, Wm. Kitzrow, Milwaukee	1 00
Best show lilies, Miss Kate Pfeffer, Pewaukee	1 00
Best show stocks, Wm. Kitzrow, Milwaukee	1 00
Best show balsams, Wm. Kitzrow, Milwaukee	1 00
Best show green house plants, Wm. Kitzrow, Milwaukee	7 50
Best 20 varieties green house plants in bloom, Wm. Kitzrow, Milwaukee	5 00
Best 10 geraniums, Wm. Kitzrow, Milwaukee	3 00
Best 6 fuschias, Wm. Kitzrow, Milwaukee	2 00
Best 6 carnations, Wm. Kitzrow, Milwaukee	2 00
Best display by exhibitors, Wm. Kitzrow, Milwaukee	7 50
Second best, Miss Kate Pfeffer, Pewaukee	5 00
Best display of ornamental foliage plants, Wm. Kitzrow, Milwaukee	3 00

CLASS 36.—*Flowers by Non-Professional Cultivators.*

Best floral design, Mrs. E. R. Copeland, Monroe.....	\$7 50
Best collection cut flowers, Miss Emily J. Smith, Green Bay.....	4 00
Second best, S. B. Smith, Dodge's Corners... ..	3 00
Third best, Miss Merial L. Park, Dodge's Corners.....	2 00
Best basket flowers, Miss Emily J. Smith, Green Bay.....	3 00
Second best, Miss Merial L. Park, Dodge's Corners.....	2 00
Best pair round bouquets, S. B. Smith.....	3 00
Best pair flat bouquets, Merial L. Park.....	2 00
Best bouquet everlasting flowers, S. B. Smith.....	3 00
Second best, Miss Emily J. Smith.....	2 00
Best display dahlias, Mrs. A. A. Boyce, Lodi.....	3 00
Second best, Mrs. E. R. Copeland.....	2 00
Best 10 named dahlias, Mrs. A. A. Boyce.....	2 00
Second best, Miss Merial L. Park.....	1 00
Best display verbenas, Mrs. E. R. Copeland.....	3 00
Second best, Miss Merial L. Park.....	2 00
Best show seedling verbenas, Miss Emily J. Smith.....	2 00
Second best, Mrs. C. C. Kingsley, Milwaukee.....	1 00
Best show asters, Miss Emily J. Smith.....	2 00
Second best, Mrs. E. R. Copeland.....	1 00
Best show perennial phlox, S. B. Smith.....	1 00
Best show pansies, Mrs. C. C. Kingsley.....	1 00
Second best, Miss Emily J. Smith.....	50
Best show petunias, Mrs. E. R. Copeland... ..	1 00
Second best, G. W. Ringrove, Wauwatosa.....	50
Best show dianthus (pink), Miss C. C. Kingsley, Milwaukee.....	1 00
Second best, Miss Emily J. Smith, Green Bay.....	50
Best show gladiolis, S. B. Smith, Dodge's Corners.....	1 00
Second best, Mrs. C. C. Kingsley.....	50
Best show phlox (drummondii), Miss Emily J. Smith.....	1 00
Second best, Mrs. E. R. Copeland.....	50
Best show balsams, G. W. Ringrose, Wauwatosa.....	1 00
Second best, Miss Emily J. Smith.....	50
Best 20 varieties green house plants in bloom, Mrs. C. C. Kingsley...	5 00
Best display of flowers raised by exhibitors, Miss Emily J. Smith....	7 50
Second best, Mrs. C. C. Kingsley.....	5 00
Best show ornamental foliage plants, Mrs. C. C. Kingsley.....	3 00

VICK'S SPECIAL PREMIUMS.

Best collection cut flowers from seed grown or imported by him, Miss Emily J. Smith	\$20 00
Second best, Mrs. E. R. Copeland.....	10 00
Third best, S. B. Smith.....	5 00
Fourth best, Miss Merial L. Park.....	floral chromo.
Best ornamental floral work, either bouquet or floral ornament, Miss Emily J. Smith.....	5 00

CLASS 37.—*Flowers by Professional Non-Commercial Cultivators.*

Best show green house plants, J. Pollard, Milwaukee.....	\$7 50
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DEPARTMENT H.—MACHINERY.

CLASS 39.—*Operative and Other Machinery.*

Best band saw for scroll work, J. D. Gasner & Co., Milwaukee.....	\$10 00
Best model steam engine, J. D. Gasner & Co., Milwaukee.....	2 00
Best planing and matching machine, J. D. Gasner & Co., Milwaukee.	10 00
Best display of wood working machinery, J. D. Gasner & Co., Milwaukee.....	20 00
Best steam fan blower, J. D. Gasner & Co., Milwaukee.....	2 00
Best display of machinery for working on iron or other materials, J. D. Gassner & Co., Milwaukee.....	25 00
Rundle & Spence, Milwaukee, steam trap.....	Dip.
Beach & Moore, Chicago, portable steam engine in operation.....	Dip.
W. J. Hanna & Co., Chicago, portable hay press in operation.....	Dip.
Ketchum & Morgan, Appleton, paper cutter.....	Dip.
Brice & Gronberg, Grand Haven, Mich. circular saw guide.....	Dip.

CLASS 40.—*Field Machinery and Articles for Agricultural and Domestic Purposes.*

Otto Esche, Milwaukee, bridge gate.....	Dip.
Winship Brothers, Racine, grain and seed separator.....	Dip.
W. C. Raynor & Co., Milwaukee, sulky hay rake.....	Dip.
Sprague & Sackett, Milwaukee, riding and walking sulky corn cultivator and potato digger combined.....	Dip.
Northrup & Thorson, Madison, patent farm gate.....	Dip.
Clegg, Wood & Co., Dayton, Ohio.....	Dip.
Althouse, Wheeler & Co., display wind mills and pumps.....	Dip.
Kahler & Silverzahn, Sheboygan, feed cutter.....	Dip.
Charles Fackler, Dubuque, Iowa, Hoosier hay carrier.....	Dip.
Charles Fackler, Champion horse fork.....	Dip.
A. P. Dickey, Racine, warehouse fanning mill.....	Dip.
J. C. Hussey, Black River Falls, wood sawing machine.....	Dip.
E. J. & Wm. Lindsey, Milwaukee, chilled sod and stubble plows, combined.....	Dip.
E. J. & Wm. Lindsey, display of Oliver's plows.....	Dip.
Emerson & Co., Rockford, Ill., two horse corn cultivator.....	Dip.
F. H. Lotta, Battle Creek, Michigan, Champion cultivator.....	Dip.
Ira M. Hardy, Oshkosh, portable post driver.....	Dip.
Best covering for steam boilers, Milwaukee Boiler Covering Co., Mil.	\$5 00
Best middlings purifier, Nathan Bros., Milwaukee.....	10 00
Best portable forge, J. D. Gasner & Co., Milwaukee.....	2 00
Best iron frame sand papering machine, with dust sucker attachment, J. D. Gasner & Co.,	4 00
Best power feed panel raiser, J. D. Gasner & Co.,	3 00
Best Blacksmith hand drills.....	2 00
Best sash, door and blind relishing and mortising machine, J. D. Gasner & Co.,	5 00
Eureka riding plow attachment, Laraway, King & Perrine, Minneapolis, Minnesota.....	Dip.

DEPARTMENT I. — MANUFACTURES.

CLASS 41. — *Stone Cutters, Work, Brick and other Building Materials.*

Best specimen stencil cutting, Chas. H. Clarke, Milwaukee	\$3 00
Best specimen drain tile, Chas. Hermann & Co., Milwaukee	3 00
Best roofing material, other than shingle, P. O. Johnston, Milwaukee	5 00
Best display of earthen ware by manufacturer, Chas. Hermann & Co., Milwaukee	Dip.
Best show of bath brick, Christian Hambrecht, Milwaukee	Dip.
Best display of stone ware, Chas. Hermann & Co.	Centennial Medal.
Best slatestone water cooler, P. O. Johnston, Milwaukee	Centennial Medal.
Best weather strips, G. A. Herrick, Monticello	Centennial Medal.
Excelsior sash balance, R. J. Schwab, Oshkosh	Dip.

CLASS 42. — *Mettallurgic Products.*

Best steel wire, Wm. Frankfurth, Milwaukee	\$2 00
Best copper wire, Wm. Frankfurth, Milwaukee	Dip.

CLASS 43. — *Stoves, Furnaces, Hollow Ware and Articles of Hardware.*

Best cooking stove for wood, A. W. Coe, Milwaukee	\$3 00
Best cooking range for families, in operation, L. F. Wergin, Mil.	3 00
Cooking range for families, Jacob Koempfer, Milwaukee	Centennial Medal.
Best ornamental parlor stove, A. W. Coe, Milwaukee	\$3 00
Best display stoves, A. W. Coe, Milwaukee	Grand Silver Medal.
Best exhibition brass and copper wire, E. H. Daniells & Co., Mil.	Dip.
Best show of hollow ware, Wm. Frankfurth, Milwaukee	Dip.
Best sample of fire grates, A. W. Coe, Milwaukee	\$3 00
Best display shelf hardware, Wm. Frankfurth, Mil.	Grand Silver Medal.
Best display counter scales, Wm. Frankfurth, Mil.	Dip.
Monitor oil stove, Smith & Hopkins, Mil.	Centennial Medal.
Display of twine, cordage and rope, J. Rauschenberger, Mil.	Centennial Medal.
Florence oil stove, Schster, Fitts & Paine, Mil.	Centennial Medal.
Street lamp sign, E. B. Frink, Waterbury, Vt.	Centennial Medal.
Sample of malleable iron castings, Milwaukee Malleable Iron Works, Mil.	Centennial Medal.
Tin, Jappanned and pressed ware, Wm. Frankfurth, Mil.	Centennial Medal.
Wash wringer, Wm. Frankfurth, Mil.	Dip.
Winchell's patent oil cans, C. A. Folsom & Son, Mil.	Centennial Medal.
Oil and oil cans, Porter Oil Co., Mil.	Centennial Medal.
Display of soda fountain, draught apparatus and beer swimmers, Otto Zweitusch, Mil.	Centennial Medal.

CLASS 44. — *Silver, Brittania and Crockery Ware.*

Gold and silver electro plating, Racine Silver Plate Co., Racine, Silver Medal.	
Collection glass, china and earthen ware, Blair & Persons, Mil.	Grand Silver Medal.
Display of chandeliers, Blair & Persons, Mil.	Centennial Medal.

CLASS 45. — *Surgical, Dental, Mathematical and Philosophical Instruments, etc.*

Mathematical and philosophical instruments and apparatus, Julius Lande, Mil..... Dip.
Electric pen and press, C. W. Gearhart, Mil..... Centennial Medal.

CLASS 46. — *Chemical Manufactures.*

Best sample blacking, J. Grant, Milwaukee..... \$2 00
Best sample yeast cakes, National Yeast Co., Chicago Diploma.
Best show of fancy soaps and perfumery, Charles L. Kierwert & Co., Milwaukee..... Silver Medal.
Best display of coffee, spices and baking powder, C. E. Andrews & Co., Milwaukee..... Centennial Medal.
Best liquid slating, tablet and blackboard, J. Grant, Milwaukee Centennial Medal.

CLASS 47 — *Carriages, Wagon Work, etc.*

Best double carriage, Chas. Albresh, Milwaukee Silver Plate, \$5 00
Best single top buggy, Wm. Servis, Sheboygan Falls.... Silver Plate, 5 00
Best single open buggy, Wm Servis, Sheboygan Falls ... Silver Plate, 5 00
Best trotting wagon, Wm. Servis, Sheboygan Falls..... Silver Plate, 5 00
Best pleasure wagon, H. S. Benjamin, Milwaukee..... Silver Plate, 5 00
Best double sleigh, Wm. Servis, Sheboygan Falls Silver Plate, 5 00
Best single sleigh, Wm. Servis, Sheboygan Falls Silver Plate, 5 00
Best common farm wagon, J. & J. Egglehoff, Milwaukee, Silver Plate, 5 00
Best 3 spring and 3 seated wagon, Fish Brothers & Co., Racine..... Silver Plate, 5 00
Patent draught apparatus, Mueller & Meyer, Milwaukee..... Diploma.

CLASS 48. — *Cabinet and Willow Ware, Cooperage, etc.*

Best ladies' workstand, O. E. Field, Milwaukee..... Silver Plate, \$5 00
Best spring bed bottom, J. Bates, Janesville..... Silver Plate, 5 00
Best dozen brooms, Aug. F. Lemke, Milwaukee..... Diploma.
Climax churn, L. F. Wergin..... Commended.
Baby jumper, Mrs. Lucy L. Wilson, Milwaukee..... Centennial Medal.

CLASS 49. — *Leather and Leather Manufactures.*

Best 6 sides upper leather, Trostel & Gallow, Milwaukee..... Diploma.
Best 6 sides harness leather, Trostel & Gallow, Milwaukee..... Diploma.
Best 6 sides kip skins, Trostel & Gallow, Milwaukee..... Diploma.
Best 6 sides calf skins, Trostel & Gallow, Milwaukee Diploma.
Split leather, Trostel & Gallow, Milwaukee Commended.
Best wagon harness, Chas. H. Clarke, Milwaukee \$5 00
Best exhibition of pegged boots and shoes, Geo. A. Phillips, Milwaukee..... Silver Plate, 10 00
Best exhibition sewed boots and shoes, Geo. A. Phillips, Milwaukee..... Silver Plate, 10 00

CLASS 51. — *Textile Fabrics, Clothing, etc.*

Best exhibition of woolen fabrics, Berlin Woolen Mills, Berlin Silver Plate, \$20
Best display of clothing, Fried & Neuman, Milwaukee... Centennial Medal.

CLASS 52. — *Domestic Manufactures.*

Best rug of any material, Mrs. A. H. Cutting, Racine	\$4 00
Best woolen stockings, Mrs. David Whitehead, Whitewater.....	2 00
Best woolen mittens, N. Coffin, Lamartine	2 00
Best 2 lbs. woolen yarn, Mrs. David Whitehead, Whitewater.....	2 00
Best pair cotton stockings, Mrs. C. H. Root, Ripon.....	2 00
Best white quilt, C. W. Harvey, Beaver Dam.....	3 00
Best knit counterpane, Mrs. W. A. Dean, Milwaukee	3 00
Best wrought shawl, Mrs. A. H. Cutting, Racine	3 00
Best exhibition of taste and skill in cutting and making ladies dresses, Mrs. A. H. Cutting, Racine	5 00
Best gents shirts, J. D. Wood & Co., Milwaukee	3 00
Best pair woolen socks, by girl under 15 years of age, Miss Boyce, 9 years of age, Brooklyn	2 00
Best 6 skeins woolen stocking yarn, by girl under 15 years of age, Miss Boyce, Brooklyn.....	2 00
Log cabin quilt, Mrs. Fanny M. Vilas, Madison	Centennial Medal.

CLASS 53. — *Millinery and Dress Making.*

Best and greatest variety of articles of ladies under clothing, Miss Annie Janes, Milwaukee.....	Silver Plate, \$5 00
Infants' robe, Miss Mary Jones, Milwaukee	Worthy of Mention.

DEPARTMENT J. — FINE ARTS.

CLASS 54. — *Music and Musical Instruments.*

UPRIGHT GRAND PIANO.

C. G. Hiecke, Milwaukee	Diploma.
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CLASS 55. — *Works of Art.*

Best portrait in oil from nature, Miss Dora L. Park, Dodge's Corner	Silver Plate, \$10 00
Original landscape in oil from nature, Miss Clara E. Waite, Milwaukee	Silver Plate, 10 00
Second, Theodore Heiss	Silver Plate, 5 00
Best portrait in crayon from nature, Theodore Heiss....	Silver Plate, 2 00
Best portrait in crayon from photograph, Miss Clara E. Waite, Milwaukee.....	Silver Plate, 2 00
Best india ink photograph, Theodore Heiss, Milwaukee,	Silver Plate, 1 00
Watercolor, stipple, photograph, Mrs. J. T. Cavanaugh, Milwaukee	Silver Plate, 10 00
Best oil photograph, Theodore Heiss	Silver Plate, 10 00
Best specimen statuary, Blair & Persons, Milwaukee ...	Honorable Mention
Best carving in wood, John Fry, Prairie du Sac.....	Silver Plate, 2 00
Best copper-plate engraving, Milwaukee Lith. and En- graving Co., Milwaukee.....	Silver Plate, 2 00
Best specimen pencil drawing from nature, Theodore Heiss	Silver Plate, 5 00

Best exhibition in lithography, Milwaukee Lith. and Engraving Co., Milwaukee	Silver Plate,	2 00
Best exhibition by apprentice, Frankie W. Andee, Milwaukee	Silver Plate,	2 00
Best collection of oil paintings, not less than 25, Mrs. W. P. Stowe, Milwaukee.....		50 00
Second, Mrs. C. P. Wilkins, Chicago		25 00

CLASS 56. — *Needle, Shell and Wax Work.*

Best crochet, or fancy knitting work, Miss Marcella Mitchell, Milwaukee	\$4 00
Second best, A. E. Foote, Milwaukee	2 00
Best tidy, Mrs. H. Fischel, Milwaukee	3 00
Second best, Mrs. Martha Irving, Milwaukee	2 00
Best tidy, Miss Marcella Mitchell, Milwaukee	Commended.
Best specimen historical embroidery, Miss Addie Littell, Milwaukee.	5 00
Best worsted embroidery, Miss Nellie Gillson, Racine	4 00
Best embroidered chemise Miss Marcella Mitchell, Milwaukee.....	3 00
Best raised worsted embroidery, Mrs. H. Fischel, Milwaukee.....	3 00
Best needlework, or floss embroidery, Miss De Etta C. Sturtevant, Milwaukee	4 00
Second, Mrs. L. Wetherbee, Milwaukee.....	2 00
Best silk embroidery, Mrs. L. Wetherbee, Milwaukee.....	2 00
Best sample work in wax, Mrs. A. A. Haskin, Milwaukee.....	2 00
Second, Annie Bebb, Milwaukee	1 00
Work in wax, Mrs. A. E. Foote, Milwaukee	Honorable Mention.
Best sample work in feathers, Miss Kittie J. Durbin, Milwaukee	2 00
Second, Miss Marcella Mitchell.....	1 00
Best sample bead-work. Miss Marcella Mitchell	2 00
Best piece fancy netting, Miss Jane Warner, Milwaukee	1 00
Best exhibition hair-work, Mrs. A. A. Haskin, Milwaukee	Silver Medal.
Exhibition hair-work, Miss Susie L. Babcock	Commended.
Worsted embroidery, chair, Miss Rosa Fitzsimmons, Milwaukee,	Honorable Mention.
Worsted embroidery, chair, Mrs. P. J. Thomas	Honorable Mention.

DEPARTMENT K. — NATURAL HISTORY.

CLASS 57.

Best collection of the woods of Wisconsin, Wisconsin Central Railroad Co.	Diploma.
Best collection illustrating the birds of Wisconsin, C. W. Harvey, Beaver Dam	Diploma.
Best collection of insects of Wisconsin, Joseph Jung, Milwaukee	Diploma.

STATE AGRICULTURAL AND HORTICULTURAL CONVENTION.

HELD AT MADISON, FEBRUARY 6 TO 9, 1877.

[Under the auspices of the State Agricultural and State Horticultural Societies.]

TUESDAY, 8 P. M.

Convention met in the Assembly Chamber, and was called to order by Eli Stilson, Esq., President of the State Agricultural Society, who made brief remarks touching the importance of these annual conventions to the great industrial interests of the state. Said he believed they were of increasing interest year by year, and were among the great sources of information to those engaged in the varied branches of agriculture, horticulture and mechanical industries.

Mr. Stilson then introduced President Bascom, of the University of Wisconsin, who he was happy to say was not only interested in the literary and scientific education of our people, but in their industrial culture and enlightenment as well, lending a helping hand to the advancement of agriculture.

CONDITIONS OF PROGRESS IN THE AGRICULTURAL CLASSES.

BY JOHN BASCOM, D. D., LL. D.,

President of the University of Wisconsin.

Gentlemen of the Agricultural and Horticultural Societies of Wisconsin: Every man's best defense, and really his only defense, is in himself.

"The fault, Dear Brutus, is not in our stars,
But in ourselves that we are underlings."

I shall base my words on this fundamental truth in human experience: That the issues of life are ultimately with ourselves, out of our own heads and hearts. It may take time and patience and skill to reach the right end, but it can be reached.

The thing that comes last in the growth of the plant, the development of the animal, the unfolding of human life, is often not the least but the greatest. The tree does not reach its best fruit till it approaches maturity; several seasons pass before the cow shows her true qualities, and man's highest powers, those of reason and righteousness, do not put forth either in the individual or in society, till the lower nature, like root-leaves, has spread itself broadly and luxuriantly on the earth. The classes that shall play a most conspicuous and interesting part in perfected human order come to the front slowly, and take on their strength with many mistakes and much hesitation.

The arts and the fine arts, the social culture and the free institutions of the race, have originated in cities. The cities of northern Italy and central and western Europe have been the nurseries of our modern civilization; and if any part of a country has lain waste, it has been its farm lands. If any portion of the population has shown the dullness of ignorance and suffered the poverty of lawlessness, it has been the farming population. Hitherto the tillers of the soil, in most countries, have been not nature's children, but her foster-children, with the largest share of work and the least share of inheritance. All this is changing and to be changed, and those on whom nature will ultimately lavish conspicuous gifts, will be those whom she takes to her own most immediate service and cultivation. But this result cannot be reached till intelligence and prosperity flood the land, and flow out over the entire country. The farmer may be the latest to share the full benefits of civilization, but when his portion does come, it will be the liberal one of love. Benjamin was the youngest son.

Of the conditions of this prosperity, as I conceive them, I wish to speak to you this evening. We look forward to a good time coming that reaches us, like the day, long before it is daylight, and yet longer before it is high noon; and we inquire what are the conditions of its progress, and what will be the forms of its good estate. The first condition will be this, I think; a large division of land, many homesteads, many independent cultivators. Farmers

constitute, and must constitute, almost one-half of the human family. As the tree has the root and the stem that take half and half of the common substance, so the human race fastens itself to the land with a moiety of its entire strength. This rooting will be done best, will give the strongest hold and most nourishment, when each farmer owns the land he tills, puts into it his personal power, and gets back from it his independence and position.

The tendency always is, as the democratic, the popular element, gets uppermost, as the people take the front, to divide and subdivide land. This tendency puts farmers as a class of workmen on a fair footing, spreads prosperity more evenly through them, and marshals them as a body in solid rank and even file into the army of industry. On the other hand, extended ownership, as in England, divides the class within itself, and yields a large number of farm-hands, with no interest or inheritance to the land they till. These, already dependent, easily slip into ignorance and destitution, and drag down and degrade the toil they undertake. A calling that does not redeem its workmen will never be found compatible with class honor, material enlightenment, or that universal progress with which philanthropy busies itself. The question of pervasive interest is not, What attainments have this or that farmer; how much has he accumulated? but, What is the standard of social comforts which belongs to the class?

There are two conditions of a comparatively even distribution of wealth, and thus of its social opportunities; that all property, and especially real estate, by the laws of inheritance and transfer, shall be pliant, easily passing from hand to hand, and divided between many hands; and that there shall be relatively equal intelligence, or at least skill, among the owners and cultivators of the soil. The last is to us the point of special interest. Property tends to pass into the possession of those who can use it to the best advantage. They covet it more than others; can pay more for it than others; and can realize more from it than others. If ten farmers with equal farms were to live side by side, one of whom had unusual skill and industry, while the remainder were deficient in these qualities, the thrifty farmer would, in the lapse of years, inevitably encroach upon his neighbors. It is not in industry as in the dream of Pharaoh, the fat ears, not the lean ears, devour their fellows. If land, therefore, is to be anything like evenly distributed among farmers, thrift and intelligence must first be divided among them.

There are two claims advanced for farming on a large scale with large ownership; first, that more skill can be brought to it; second, that more and better machinery can be used in it. The pith of both of these considerations is the implied fact that the wealthy owner is more intelligent than his tenants and workmen. The balance will sink on his side only by virtue of knowledge. Let skill be about equal, and the small farmer will have the advantage over the large farmer. More personal superintendence, more economy, more loving, pains-taking labor will belong to him. Sagacity and honesty combined, will easily overcome, by co-operation, the want of machinery, while nothing can compete with the omnipresent eye and hand of an owner. Let there be general intelligence among farm hands, and land is sure to fall to them; let them be ignorant, and land is sure to elude them, and they are sure to sink into a coarse class of servile laborers. If each farmer says to himself, My farm shall improve in fertility and beauty each year, the time will quickly come in which no man can lightly buy it of him, and no man wrest it from him.

What the average size of a farm may, to advantage, be, depends on the products raised, and the kind of cultivation prevalent. A farm should be large enough to give labor and generous support to one family and its natural adjuncts. If farming is thorough, and the produce raised various, a comparatively small portion of land will do this. It is fortunate that skill and variety in productions are both on the increase with us, and that thus an extended division of land may take place for a long time to come. We and our children after us have an open door of prosperity, if we know how to enter into it. In concluding this point of the division of land, we emphasize the fact that the ultimate, fortunate issue turns on *general* intelligence. The school house by the roadside is the farmer's Bethel, and the saloon at the corners the farmer's bane. A little unwholesome fermentation in the belly will take the place of a great deal of wholesome fermentation in the brain.

The second general condition of prosperity with farmers is variety of productions. Slave-labor and all the lowest forms of farm-labor are attached to coarse, wholesale production of single staples, like cotton, sugar, tobacco, rice; or more rarely corn, wheat or cattle. There are manifest evils that attend on an unvaried form of agriculture extending over a large region. Any failure of crops, the

ravages of an insect, or a decline of prices, become at once a public disaster. We have experienced something of this even in Wisconsin in the years that have just passed. The power to endure hard times, and to rally from them, are much less in a state where production is relatively uniform.

The profits of such farming are also usually smaller, as the markets are more remote, and crowded with more sellers. Large branches of production sink quickly to the minimum of profits.

There is also much less intellectual stimulus in uniform production. It slips into routine, and men trudge on in the steps of their fathers. The exhaustion of the soil is more rapid, with fewer compensations in the cultivation of single products. Abundance of manure and rotation belong to the quick interchange of varied husbandry, while a single crop over a large area is a steady draught.

To introduce, however, an unaccustomed branch of farming, to bring it successfully forward, and open up for it an adequate market, are a delicate work; it is only the leading spirits in husbandry that are capable of it. Many can readily follow where but few can successfully lead. Hence the agricultural interests of a state require not only general intelligence, but special intelligence; not only a common school education for all our agricultural population, but a more patient and extended training for a portion of it, preparing men who shall be leaders and explorers in tillage. Farmers are not interested simply in the common school, but in the high school, and college, and agricultural college as well. If we divide education, and assign the lower portion to one class of our people, we shall find that we have divided wealth and honor in a like way, and made a similar distribution of them. They will be hangers on at the skirts of society, who are hangers on at the skirts of knowledge. No man can be permanently helped but by himself, and in himself.

The horticulture of the state affords an illustration of the difficulty of adjusting even familiar culture to new conditions. Is it possible to raise good fruit in reasonable variety with reasonable certainty and by reasonable labor in Wisconsin? This is a plain, pushing question put to every intelligent horticulturist. The easy off hand answer may be, No. It is very possible that the ultimate answer of the patient, skillful worker may be an emphatic, Yes. Old varieties capable of cultivation may be more carefully chosen,

new varieties secured from them, and the effects of shelter and moisture more thoroughly inquired into. The heat and dryness of our summers, followed by the extreme cold of our winters, are formidable obstacles to the cultivation of apples and pears. Our summers are torrid, our winters frigid, and our fruit trees cannot bear both extremes. The dry heat deadens the sap vessels, and checks the circulation; the severe cold has the same effect, and when the spring opens, though there may be much life in the roots, the sap can not ascend freely to the upper branches; lower buds are pushed, and the top of the tree slowly perishes. Positions, cool and damp in summer, and sheltered in winter, may prove more favorable. At all events this is the nut, thick in the shell and thin in the meat, that nature now offers to our hand; only years of intelligent work will make it rich and toothsome.

This brings us to our last position; there can not be much variety in our agricultural products without corresponding variety in all forms of labor, and entire harmony between its several parts.

Mechanical industries, in their various branches, must be brought near to us and widely scattered among us, before we can greatly vary our produce and prepare to supply the secondary wants of the household. A large farming population cannot hold the manufactures of the world at arm's length, without suffering an inability to raise bulky and perishable produce. These two things must be ready to grow up together. The farm must cheapen food, furnish it in variety, and so entertain hospitably the industries of the world; and these industries must, as they thicken population, call forth and repay the skill of the farmer. The world must come to our doors to be fed, and we must open our doors to feed it. Farmers, as one-half the social world, as furnishing food and raw material to the other half, and receiving from it the comforts, instruction, and elegancies of life, should be put in the closest and most harmonious ministration to mechanical, commercial and professional pursuits. Separation is barbarism, intercourse is enlightenment.

Everything, therefore, which tends to distrust and divisions, which makes the farmer jealous and exacting, which inclines him to meddle with legislation in his own behalf, is sure to issue ultimately in mischief. Farmers are the most permanent, the most immobile, and so the most defenseless element in the state; the ones least able to wage war, and the one sure to suffer the most

severely and the longest from it. The entail and remainder of hard times and public misfortunes are certain to fall to them.

As I wish that what I have now to say should find an open ear, and have its just weight with you, I ask you for the time being to forget any special measures of legislation which have found favor with you, and in reference to which we may disagree, and to direct your attention exclusively to general principles.

First, the farmer cannot afford to seek by legislation any separate benefits for his own branch of production, nor can he afford to allow others to establish or maintain their industries by special protection. He cannot afford to take these advantages himself, because the food and the raw material which he is to furnish enter into all kinds of production, and cannot be raised in price without depressing those correlative branches of industry in whose prosperity his own is involved. The general advantage of the community is the farmer's private advantage. Farmers, constituting one-half of society, must make their sales to the other half, and large purchasing power in this moiety must correspond with large production in that moiety.

Much less can the farmer afford to allow single forms of industry to protect and build up themselves at the general expense. His interests lie in the entire circle of production, not in any one portion of it. Farmers are too many to gobble up, by any legislative trick, large gains; they are also too many to remain idle and see others do the same thing. As themselves, half the population, they must stand by the whole population. Farmers, by the mere fact of their numbers, are pledged not to steal themselves, or to allow others to steal. The cry of hurly-burly, every man for himself, will necessarily leave the great majority of them in the lurch. Farmers are too numerous to carry on an intrigue; they may possibly make a mob, but a mob tramples itself and others indiscriminately. Any class so large as they are, and so unequal in intelligence, are sure, in pushing a political measure, to fall into the hands of demagogues. Take any class movement or class legislation which farmers have attempted: What has the average farmer gained by it, except the opportunity to hear the bitter language of unrest and violence, and to come in at the bill-paying? Of course I shall not be understood to refer to those social and industrial organizations by which farmers have done and are doing, and are to do, so much for their advancement.

The very numbers of farmers, and the nature of their stake in the prosperity of the entire community, fit them preëminently for a firm assertion of strictly equal legislation in behalf of all; and render it, at the same time, quite impossible for them successfully to betray the commonwealth. Farmers make most respectable honest men, but most foolish and ridiculous rascals. Sheep cannot hunt successfully with wolves, nor farmers with rapacious politicians. I say this with the most profound respect for the farmers; the same respect that I have for the honest man, who, in a clear-sighted way, loves truth, loves fair dealing, loves the commonwealth.

I must, in my social morality, put the sentiment of honesty in high honor over against that cunning which, fox-like, is always lurking about, interested only in an exposed point for plunder; a cunning which, when it becomes voluble in man, makes the demagogue and politician.

Let me give you one test in our day of a demagogue, an indiscriminate outcry against capital and capitalists. A demagogue is one who seeks private ends and personal notoriety by a wicked or a blind attack on existing institutions and social sentiments. If capital, in any branch of it, is receiving undue legislative favors; if it is making a mischievous use of natural advantages even, it is certainly the right of every citizen to point out the fact and propose the remedy. If we believe capital to require, in its use, special legislation, and we propose this legislation, our position is correct, though our theory may be false; but if, avowedly in behalf of production, we open an indiscriminate attack on capital, the chief instrument of production, and on the laws and customs under which it operates, we are disorganizers and demagogues. We need more capital, not less capital; more rich men, and more well-to-do men, not fewer. It is a rabid heresy in industry which leads us to regard the acquisition of wealth as in some way wrong, and the use of capital open to suspicion. This notion has in it the taint of the worst communism, and communism is the anarchy of industry. If a man has gotten his wealth dishonestly, either by private or public fraud; if he has won it in a line of business mischievous to the community, or handled in an aggressive, grasping way, these charges may be clearly made, and the guilt, if possible, be brought home to him; but to raise an angry cry against rich men as a class,

against "bloated capitalists," is playing the part of a surly dog, whose low growl betrays his ill will and hunger. Capitalists are no more likely to be socially objectionable than other men; and as for wealth itself constituting a species of moral bloat, the strong desire of every one of us to secure it gives the lie to the belief in this notion. Our industrial indebtedness to capital and capitalists is very great. Why does a merchant make a large fortune? Because he offers us better goods at lower prices than any one else, and we purchase of him in large numbers, and *we* make of him a rich man. Poor fellow, he could not help himself. Why does a manufacturer prosper? Because his wares are first-class and cheap, and so in general demand. The more industrious and intelligent a man is, the more he consults the wants of his fellow citizens, the more sure is he to become rich—to become a capitalist. These are not the men to be feared; but the merchants, the mechanics, the farmers, who do their work so poorly that they make nothing—that they cannot even keep what they have. We are all becoming capitalists in the measure of our thrift, and there is to-day no more general and just a test of our worth to production than our possession, by our own labor, of capital. Many farmers are cross in Wisconsin because they have not used borrowed capital wisely. They should scold themselves just as sharply for mistakingly borrowing money as others for mistakingly loaning it to them. If the unthrifty farmer would gladly shake off the crushing debt, so in many cases would the unfortunate lender be right glad to get back what is honestly his own. We would pity all men who need our pity, and we would be just to all. We have no sympathy with the creditor that grinds, nor yet with the debtor that shirks. If there may be cruel cunning on the one side, there may be dull indifference and gritty ill will on the other. Let us be fair to each other, and charge home our own faults first. If we have been willing to overload ourselves, it is not so strange that we have found others willing to put the burden on. I have seen asses loaded so that you could not see their ears. What we want for industrial prosperity is capital, the wisdom to make it, the wisdom to be able to redirect it in ever multiplying and broadening branches of production. Our unjust clamors against it are only fitted to frighten it away from us, and so to sink us deeper in disaster. There is no distinct class of capitalists—we are all capitalists in the measure of our wealth; and

let us pray God that while intelligence, economy and industry make us capitalists, wisdom, sympathy and good will may make us beneficent ones.

If farmers take up the cry of "Down with capitalists," nine of them will become dolts and the tenth a knave. They will be as kites which follow vultures: these will eat the carcass, and those will whet their bills in emptiness and quarrel over the bones.

If there should ever be among us that worst of household feuds, the feud between labor and capital—the rich and the poor, I should cast in my fortunes with the poor, for they are the many and most need help. But the first thing that I should strive to persuade them to would be, not to cut off their own fingers or bite off their own tongues, that they may cast the bloody trophies of rage and defiance in the face of their enemies. If I have known capitalists whom I would not willingly trust with another's money, I have known workmen whom I would not willingly trust with their own money. There is one thing pretty evenly and pretty liberally divided in this world, and that is, faults.

With all our sympathy for the poor and unfortunate, let us be just. Nature, not man, has laid a trap for the unwary and the indolently hopeful in the years just past. Good crops have encouraged the borrower and the lender, and made them open and easy; a series of bad crops have closed in on them like winter, and now they spend their leisure in cursing each other. Is it not true that both alike have been imprudent, and both are alike losers? If a farmer cannot, on his own farm, pay the interest of the money he owes on it, does he suppose that the lender, a stranger and remote, can take that same farm and pay from it the very interest and principal which the farmer himself could not meet? If any farmer does think this, he must also think himself a very poor sort of a man. All that I wish to impress on you is, that we are all in the same ship, and that we may much better go kindly to work together to navigate it, than to spend our time in recriminations. The man who swears most freely at his fellows is not the most philanthropic.

The farming interest, then, needs three industrial conditions for permanent prosperity: a large and slowly enlarging division of land, an increasing variety of production, and close contact and perfect harmony with many forms of industry. To secure these three things, it needs intelligence and fair mindedness; an in-

telligence that is profound enough to be fair minded, not an inch of clear water over a foot of mud. Farmers, therefore, further need schools, high schools, colleges, a lively interchange of stirring truths, an enlarging share in human history.

Great are the natural advantages of the farmer; independent and healthy labor, a varied exercise of his powers, the solid comforts of home, the opportunity to gather about that home increasing beauty and enlarging social enjoyments. He suffers the grave disadvantage that he may be easily overburdened with hard work, and so sink down into the dullness of coarse, ignorant, and poorly requited toil. The only safety, the only mastery, is in himself. What the farmer is, that farming will be, and the farmer will be what his intelligence, activity and honesty make him.

My fellow citizens, my fellow laborers, you will not win, neither God, nor nature, nor man will let you win, without you have in yourselves the courage, and patience, and wisdom to win; and then you will win magnificently, for man, and nature, and God will help you win.

Secretary Field said he had listened with great interest to the address, and agreed with it, that too much intelligence could not be brought to bear upon the business of farming, but he desired President Bascom to explain how the farmers were to keep their sons upon their farms after they had been educated at the University. When they had attained that point of education and intelligence which best fit them for successful agriculture, and give dignity to the profession, they gave up farming, and sought other professions, leaving the farmer without skilled and educated labor.

President Bascom replied that those students who chose the professions had made up their minds to do so before they entered the University; that the farmers furnished more students than any other class, but that their influence was not lost to the farmers when they entered other avenues of labor; the tendency was to lift up farmers and to exalt their profession. It would be a work of time, but farming would be looked upon with more and more favor as its results, through the aid of more intelligent methods, were better understood and appreciated.

Mr. Hutchinson thought merchants were supplied from the farm as well as the professions, and that the country furnished the cities with brain as well as muscle.

Hon. Matt. Anderson did not agree with President Bascom in reference to legislation. Farmers had been robbed by class legislation. The entire legislation of the country had always been in favor of manufacturers, and directly and entirely against the interests of the producing classes, and he denounced it as class legislation, tending to make the rich richer and the poor poorer.

President Bascom corrected the speaker, and said he was in favor of equal legislation for all.

Secretary Field thought the address did lean a little too much toward capital. Labor and capital ought to go hand in hand, but capital was able to take care of itself, while labor needed protection. Capital was taking the lion's share of the profits of production, and leaving a beggarly subsistence to labor, and such had always been the case. Capital demanded unquestionable security for its investments, and left all the risks and losses to labor.

Senator Arnold said many of the farmers were capitalists, and the inevitable tendency of capital was toward centralization. Capitalists would take advantage of legislation when they could, but as the farmers were in the majority, they were themselves responsible for any shortcomings against their own interests.

On motion of Secretary Field, a vote of thanks was unanimously tendered President Bascom for his interesting and instructive address.

Adjourned to 9 A. M., Wednesday.

WEDNESDAY, 9 A. M.

Convention met in the State Agricultural Rooms. President Stilson called to order and made brief remarks in relation to improved methods in general farming, and the increased facilities afforded the farmer in the production of his crops by improved machinery.

The attendance upon the convention was very large, nearly every county in the state being represented, and a large number of the district and county societies, associations, granges, farmers' clubs and other industrial organizations of the state were specially represented by elective delegates.

DAIRY BUSINESS — HOW TO MAKE IT PAY.

BY F. C. CURTIS, ROCKY RUN.

The subject before us is one susceptible of a wider range than I am able to give it in this paper. How to make the dairy business pay in dollars is the first query naturally propounded, and a very difficult one to answer satisfactorily to those in haste to become wealthy. In fact it is hardly susceptible of such an answer. I think it is good advice, to start with, in this question of paying, to first pay our debts as fast as practicable. For my own part, I acknowledge a great indebtedness to the soil I have occupied for thirty years, the first twenty of which but little payment was made in return, but for the last ten I have gradually worked into dairying, and feel confident that the same course, judiciously pursued, will eventually pay off my obligation to this soil, so impoverished by the force of circumstances, and in the meantime I feel confident that I am making it pay in dollars more surely than any other plan that I can devise. Just how to advise others as to the best course to pursue in dairying is quite difficult, as circumstances, soils, etc., differ so widely. At the outset, the farmer should have a clear conception of the object he wishes to accomplish. He should consider the character of his soil, the nature of his farm, the quality, abundance or deficiency of pasturage; the seasons of the year he can have plenty of food, or a probable deficiency; accessibility to a cheese factory, or ability to provide the necessary conveniences for butter making, and suitable help to make the butter and carry out the details.

The various features of the case differ so widely that I shall not attempt advice only by giving my way of management, or what I might do under different circumstances.

Of cheese making I know but little, but if 100 pounds of milk will produce ten pounds of cheese, and net 10 cents per pound, the product would be \$1.00. If the same milk would produce four pounds of butter, and net 25 cents per pound, the result would be the same. The difference would be between the expense of carriage to the cheese factory, and work in making the butter. The sour milk for feeding calves or pigs would be much more valuable

than whey. If I was near a cheese factory I should doubtless patronize it, but as I am not, I turn my attention to buttermaking, and as one of the uncompromising rules of buttermaking is a uniform temperature of 60° , and considering that I can keep this uniformity more surely in winter than in summer, I have adopted what may be called winter dairying, having my cows come in as near September as possible. If by this method my product is not as large, I get better prices, and I think the net returns exceed those of summer dairying. In my paper last year before the convention, I said good butter can be made only from good cows, well and comfortably provided for, with an equable temperature of 60° for the milk and cream during its manipulations, skill and vigilance in doing everything at the right time, good salt for seasoning and preserving, and above all, strict cleanliness must be observed during the entire process. Those rules are just as true to-day as they were one year ago, and will bear publishing once a year, and reading to every butter maker in the land every morning before breakfast.

I do not attach much importance to the particular breed of cows, though doubtless those bred in dairy countries, specially for milk and butter, for many years, possess superior qualities. I find cows that eat well generally produce good milk. If they incline too much to fat, and too little to milk-qualities, and I cannot remedy this tendency with the use of bran, I find no trouble in turning them into beef. My cows, which I consider good, have the appearance of a mixture of short horn blood, but it is generally understood that this breed, pure, is not commended for dairy purposes.

Grass is the most natural and best food for the cow, for summer, and dried grass, not so ripe that it has turned to wood, for winter. Roots, such as mangold wurzels and carrots are desirable for winter; also, corn, corn meal and bran, are necessary to keep the cows in good condition. Weeds, either green or dried, have an injurious effect on the butter product.

It would seem hardly necessary to say that cows should be protected from the inclemency of the weather, in warm, well ventilated stables — sufficiently warm that milking can be done with comfort in the coldest weather; at the same time the ventilation should be sufficient for warmer weather. The more dry bedding of straw the more comfortable will be the cow, and the freer will be your stable from noxious odors.

There is probably no moist substance so susceptible of taking up foul odors as milk, cream and butter. Those who have experienced the odor from a skunk in the vicinity of the milk room, need no reminder on this point; but they should also understand that the milk should be removed from the odors of the stable as soon as possible after it is drawn. Cows should be kindly and gently treated, particularly while milking. Professor Arnold gives such good advice upon this point that I quote from him:

“A cow carries her milk from one meal of her calf to another, or from one milking to another, held firmly in little reservoirs distributed all through the udder. The valves which open and close the passages from these reservoirs to the teats are under the control of the will; but like the muscles which close the neck of the bladder, they are naturally and constantly kept closed, and are only relaxed and opened by a special effort of the will. At milking time, these valves, by a relaxation of the cords which control them, are opened, and the milk let down in a flood upon the teats. This relaxation does not last long. After a little, the special effort to hold open the valve ceases, and they instinctively close again, shutting off the flow from the reservoirs to the teats, and retaining in the reservoirs any milk which may not have passed out. The habit of not “giving down” consists in shortening the time of relaxation, thus stopping the flow from the reservoirs to the teats before the milk is all drawn. The circumstances which tend to make a cow shorten this period of relaxation are rough treatment, fear, grief, solicitude, loud noises, in short anything that attracts attention and makes a cow uneasy. The circumstances which induce a prolonged relaxation are comfort and quietude, and freedom from disturbance and excitement, together with the relief which the flow of milk occasions. When a cow has from any cause acquired the habit of shortening the time of “letting down,” it is very difficult, and sometimes impossible to overcome it. The best way is to avoid all occasion of disturbance, and observe well those which promote pleasure and quiet for the cow, and to milk as rapidly as possible consistent with comfort, with a view to getting the milk before the “letting down” ceases. Milking rapidly does not mean jerking sharply or moving with hasty or irregular motions in the presence of the cow. Such a course would counteract the very thing aimed at. The motion of the milker should not be such as to attract her suspicions,

they should be deliberate and cool; but when set down to milking, nothing should be allowed to interrupt or retard the work. This will induce continual "letting down" by giving continual relief to the udder. The milker should bear constantly in mind the fact that the "letting down" is short, and that every moment should be availed of to the best advantage. When the milk ceases to flow, the milking should stop at once, whether it is all out or not. There is no use in hanging on after the milk stops coming, as it only cultivates and confirms the habit of 'holding back.' To give a cow the least possible occasion for holding back her milk is the best way to prevent her from forming such a habit, and the surest and readiest way to make her forget it after it has been formed. To break up the objectionable habit, let the milking be quick, quiet, easy and regular."

After the milk has been drawn, I have always acted upon the rule that the sooner it is strained and set at rest the better; and if this view is of any importance, I do not understand how it could be carried one or more miles to a butter factory without injury.

My next position is, that no matter how good and perfect the milk, good butter and full product cannot be made without the regular temperature of 60° for thirty-six to forty-eight hours for the milk and cream and churning process; 2° colder would lengthen the process a little; a little warmer would shorten the time, and ripen the cream for churning; but if kept at a uniform temperature of about 60° there will be no long or impossible churnings, but the butter will be good and come in thirty to forty minutes without the aid of some new patent churn, which doubtless from its fast or grinding action will bring the butter sooner, producing a salvey mass that cannot be made into good butter. The old dasher churn is good, but there is now a class of churns that revolve entirely, that have no works inside to agitate the cream, depending upon gravitation for agitation; these do not injure the grain of the butter, and churn all the cream, which the old dash churn does not do. I have used one of these churns, called the Rectangular, for over three years, and would not part with it without its duplicate could be procured. Last fall we had the misfortune to break one of the boxes upon which it turns, and were compelled to use one of the old patents that had been laid by; the difference in yield and quality of butter was apparent at once, as well as the improved quality of the buttermilk.

I have found great difficulty to keep the milk in the hottest weather of summer as low as 65° . If warmer than that, loss will ensue by souring before the cream all rises. A cellar nine feet deep is the best place I have found; it is ventilated so I can shut out the heat in the heat of the day, and open at night to let in cool air. The objection to a cellar for a milk room is its dampness; this dampness is no doubt caused by its being cooler than the atmosphere outside. It is evident the moisture of the atmosphere tends to the coolest place. We notice the collection of moisture on the outside of the pitcher when filled with cold water, or on the metal pump in a hot day when in use. If the cellar has any openings for ventilation, no doubt dampness will be absorbed from the outside, and as the bottom of the cellar is the coldest, it is also the dampest; hence, to avoid dampness, the milk should not be placed nearer than three feet from the bottom of the cellar. To avoid dampness and mould it may be well to notice this principle in keeping other articles also.

The milk room for winter should be kept at the required temperature of 60° . My milk room for winter is in the northwest corner of my house, which is of heavy stone — one window on the north with double glass, or an outer and inner window; it is kept at the required temperature of 60° , or nearly so, by a large heating stove in the adjoining room. This stove properly filled at night and its dampers well regulated, gives very nearly the required temperature.

The pans which contain the milk rest upon slats, which allow the milk to cool sooner than when resting upon shelves of solid board. It is very important that the animal heat should be evaporated as soon as possible, and the more surface of the pan exposed to the influence of the atmosphere, the sooner this cooling will take place. When this temperature has been maintained, the milk should be skimmed in from thirty-six to forty-eight hours — should white specks appear, skim at once. From some peculiarity of the atmosphere, cream rises sooner at one time than another. When there is not sufficient cream for churning from one skimming, it may be kept at the temperature named for two or three days, provided that it is stirred well together when a skimming is added. The churn should be thoroughly scalded before the cream is put in, and it is well to give a slow motion at first, gradually increasing, until the cream thickens and the butter appears in visible lumps,

then the motion of the churn should slacken. After the butter has come, there is a great variety of opinions of just how the butter should be handled so as to remove the buttermilk entirely. This must be done with the least possible working, or the grain of the butter will be injured. This I consider a very important point in the production of good butter, and upon which I gave my views at some length last year. I will here quote from Professor Arnold's late work:

“Butter gathered in a churn always contains more or less buttermilk, which would soon spoil the butter if not removed. There are two ways of removing it. One is by kneading it in water or brine, and the other by kneading it without water. One is called “washing” and the other “working.” The former removes it much more rapidly than the latter. As to which is the better way there are conflicting opinions. Some would not have their butter washed on any account, because they believe the flavor and the keeping of the butter are thereby injured; while others are equally tenacious in the use of water, and believe as firmly that the flavor and keeping are improved by washing.

“The flavor of butter which has been washed, is different from that which has not been washed. The difference between washed and unwashed butter is analagous to the difference between clarified and unclarified sugar. The former consists of pure saccharine matter, the latter of sugar and some albuminous and flavoring matters which were contained in the juice of the cane mingled with it, which give a flavor in addition to that of the sugar. Brown sugar, though less sweet, has *more* flavor than clarified sugar. When unwashed, there is always a little buttermilk and sugar adhering to the butter that give it a peculiar flavor in addition to that of pure butter, which many people like when it is new. Washing removes all this foreign matter and leaves only the taste of the butter pure and simple. Those who prefer the taste of the butter to the foreign ingredients mixed with it, like the washed butter best.

“The assertion is often made, and many people believe, that water washes out the flavor of the butter, but it only cleanses the butter of the buttermilk, sugar and milk acid which may adhere to it, just as clarifying sugar removes from it the foreign matters which modify its true flavor. The flavor of butter consists of fatty matters which do not combine with water at all, and cannot therefore be washed away by it.

“The effect of washing upon the keeping quality of butter depends upon the purity of the water with which the washing is done. If the water contains no foreign matter that will affect the butter, it will keep better for washing the buttermilk out than by working it out. But if the water is hard from the presence of lime, or contains anything that could injure the butter by contact with it, washing becomes an injury instead of a benefit to its keeping. Nothing but the best and purest water should be used about butter. Very hard water is always objectionable. It is not, however, so objectionable as the water from wells which contain muddy sediment so full of organic matter as to become tainted. Water standing over such mud takes in the taint, and if used for washing butter, is sure to injure it for long keeping. There is a good deal of well water, otherwise good, which is rendered entirely unfit for using about butter by reason of sediment at the bottom of the well.

“This is frequently the case in dry times when wells get low and the influx small, and the water in them is too slowly changed. I once saw a lot of nice butter spoiled entirely for table use, in twenty-four hours, by being washed with water from a well which was low, and the sediment in its bottom had become affected. It is not a very uncommon occurrence to find water in wells which people do not object to using for culinary purposes, so much affected by sediment as to be detrimental when applied to butter.”

Relative to Prof. Arnold's objection to hard water, I would say that we always used, what we call hard water, for washing our butter, and are not aware of any bad effects resulting therefrom.

At the suggestion of Mr. Willis, a dealer in butter at Portage, we made a tub of butter containing some forty pounds by washing quite freely until all traces of milk were imperceptible; salting with one ounce of Ashton salt to the pound; working the salt evenly through it at one working, and packing it at once. The top was covered with a cloth and about one inch of salt placed thereon, and a well fitting cover put over the whole tub. The butter was made and placed in the commodious store of Mr. Willis, about the middle of last June, where it has remained until the 28th of September. The season has been an uncommon bad one for keeping butter, tending to mold and rancidity. The room of Mr. Willis is a basement nine feet in height or depth, below the gen-

eral surface of the ground. The butter was stored about four feet from the bottom of the floor, the part we considered the coolest that would likely be free from mold. We opened it September 28, and found it perfectly sweet, almost free from the usual packed taste of June butter. Mr. Willis pronounced it the most perfect tub of June butter he had ever examined that had been packed for that length of time. Had it been a firkin or a package headed up so as to exclude the air, the result would not have been so unexpected.

As to working butter, once, twice or thrice, I am not so clear. Our custom has been to work butter twice, once lightly when adding the salt, and then again about twelve hours afterwards. I find dealers do not like what they term dry butter; they desire to see some bright tear drops of brine on the trier. Butter, salted from three-fourths to one ounce to the pound, and worked at twelve hours and again at twenty-four hours, the salt will be nearly all dissolved and worked out, and probably leave the butter too dry; I am confident that butter that has been standing more than twenty-four hours after churning becomes set, and handling, packing, or re-packing, has an injurious effect. I have found lately that some good butter makers advocate working butter only once, something like the plan suggested by Mr. Willis. Butter is not supposed to improve in quality after it is made, hence the desirability of an early market. My experience is that butter sells best when fresh or newly made, in white ash pails, holding from twenty-two to twenty-seven pounds, and costing from \$2.75 to \$3.50 per dozen according to size; they should be soaked with brine strong enough to bear up an egg, for twelve hours before packing; the butter packed in, hard and evenly, having at first put in a thin layer of salt at the bottom. If the package is not filled from one churning place over it a cotton cloth saturated with brine and covering the package itself. As soon as the package is filled, having been careful to pack hard and evenly, place over it a cotton cloth from which the sizing has been washed and previously soaked in strong brine. Nail up the package and put it away in a cool place until it is convenient to market it; then, when conveying it to market, avoid the rays of the sun upon it, doing all that is possible to have it placed upon the market in an unexceptionable condition.

My sales, through commission merchants, have averaged thirty

cents per pound, netting about twenty-seven cents, since the first of last September. My cows, that came in during September, now average fully three-fourths of a pound of butter per day, which is pretty good proof that they make their two hundred pounds each per annum. This, with a reasonable allowance of sour milk for calves and hogs, and a reasonable allowance for muscle expended, pays for the capital represented, and pays back a just compensation to the soil which has so freely cast its "bread upon the waters" in former days.

J. M. Smith claimed that milk kept in the cellar would not make as much butter as if kept in upper and drier rooms.

Mr. Curtis said the great thing was right temperature. Should be in dry upper rooms, with temperature not above 65°, and those able to use ice could keep it easily at about that point. No use of cooling process; never tried the effect of light.

Question. What do you do to give color to your butter when the natural food will not do it?

Curtis: I sometimes color with carrots, as they give a nice rich color and good flavor. Annatto is highly recommended.

Mr. Porter, of Mazomanie, was not in favor of working butter too much, but believed in washing it well. Thought it did not look well or taste good unless worked the second time. Believed that the east was behind Wisconsin and Illinois in the manufacture of good butter. Explained Annatto and the method of coloring butter, and claimed that it was easier prepared than coloring from carrots. Fully agreed with Mr. Curtis as to temperature, but liked mill feed better than roots for his cows. He thought bran made the most milk and corn most butter to a given number of pounds of milk. Believed in generous feeding, and that as a rule the man who feeds the best, makes the most money. Had experimented with hasty pudding, also with dry meal for feed, with good results in both cases, but thought the best results had followed from feeding warm food.

Mr. Boyce of Madison had received better results in milk from cooked than from uncooked food.

Mr. Porter stated that he preferred the native cows to foreign blood.

Mr. Kellogg, of Janesville, wished the wives and daughters of

members, were here to testify upon this subject. He gave a record of Devon, Short Horn and graded cows, as to milking qualities, and showed that the best of cows for the family or dairy were found in each of these breeds.

Mr. Griswold of Waukesha asked as to bedding for cows.

Mr. Curtis said they should have dry, clean beds, so that all odors should be taken up.

Mr. Haight enquired about the advantages of corn fodder and whether it is well to feed the corn with the fodder.

Mr. Allen, Fox Lake, approved of feeding corn upon the stalks. He fattened cattle upon it, and his pigs carefully looked after the waste.

Mr. Adams: How long should a good cow go dry?

Mr. Porter: Not more than six weeks.

Mr. Woodard, Marengo, Illinois, did not believe in coloring butter, and gave the experience of one who had taken numerous butter premiums, who had fed timothy hay and corn meal, using no coloring, and his success had been quite satisfactory.

Mr. Kiser, Dane county: To attain the best results, two objects must be kept in mind. To get a large amount of milk of good quality and keep the cow in good condition. Thought a cow in good condition gave more and better milk upon the same feed than one thin and poor. He liked corn and oats ground together for feed. Time of milking was a matter of habit; but should be regular.

Mr. Leach: How long ought a cow to be milked?

Mr. Porter: Not over ten months. Best calves, as a rule, are from those cows which go dry even longer than two months.

WHAT IS THE DUTY OF THE STATE AGRICULTURAL SOCIETY TO THE BEE-KEEPING INTEREST OF WISCONSIN?

BY PROFESSOR R. Z. MASON, APPLETON.

The Wisconsin State Agricultural Society has very properly from time to time encouraged almost every department of industry in the domain of agriculture and manufactures, by the offer of

premiums and other means, so as thereby to assist in chrystalizing the diffused particles of knowledge connected with the subjects, and to aid those in search of information to come to safe and inexpensive results. Stock-raising, horticulture and dairying are each separate and important interests, not heretofore overlooked. By virtue of this precedent, the bee-keeper feels that he, too, has claims on the attention of the society, which ought not in justice longer to be disregarded.

Too long has the idea prevailed that bee-keeping is a minor pursuit, in which so few can profitably engage; that to neglect it as a prominent feature of our national industries should not be regarded as detrimental to the general welfare. But we hope a few facts here recited will place this subject in a new light. The first point we propose to make is, that Wisconsin has growing upon her soil as large a variety and abundance of honey-producing plants and vegetables as any state in the Union. We have in our forests the Basswood, the Maple, the Elm, the Cedar, the Tamarack, the Locust, etc. We have among the countless multitude of flowering shrubs and plants, the following on almost every farm: the White and Red Clover, the Alsike, the Golden Rod, the Honeysuckle, the Currant, the Gosseberry, the Apple, the Pear, the Raspberry, the Willow, etc. In fact, from the first blossom of early spring to the shutting in of winter, the flora of Wisconsin are sufficiently prolific in the secretion of honey to afford to the industrious bee abundant forage for himself and his little family. All he wants is that considerate and rational attention to his welfare which the conditions of his domestication demand. Forage is abundant, as the following estimate will show. A German writer of eminence states the amount of honey secretions on a single acre of buckwheat per day at fourteen pounds. Taking this as a basis of calculation, and admitting that White Clover, Alsike and Basswood secrete as much per day, which I think to be at least reasonable; and for a period of sixty days during the best of the season, and allowing that one-tenth part of each township is covered with a growth of this vegetation, and we have for each thirty-six square miles in our great state the enormous amount of nearly 2,000,000 pounds of honey secreted in a single year. This vast flow of saccharine matter is now almost totally lost to the inhabitants of the state for the want of sufficient honey gatherers. These bees

cost nothing to the bee-master except that knowledge necessary to their wise and judicious treatment. Besides, this branch of industry can be successfully prosecuted, provided what is now known of bee culture can be so disseminated as to be within reach of all, for old and retired people, invalids and cripples of little use in other avocations, can follow this pursuit.

But how has this knowledge of the habits and instincts of the bee been ascertained? Not much under any phase of state patronage; but like most ideas new and removed from the common observations of everyday life, it has been acquired under difficulties, by patient investigation. It has been attained by the assiduous and unrewarded labor of a few agriculturists who have spent a lifetime, and in some instances fortunes, in making experiments in order to determine facts sufficient to make their vocation a success. The public are the parties who reap the golden harvests from fields sown with the seeds of persevering experiment, after the lapse of perhaps a hundred years. I know an old citizen of Wisconsin who has literally spent a lifetime in this expensive mode of acquiring knowledge, and has at length, in the afternoon of life, reached a demonstration of facts and figures in agriculture highly important for the public to know, but which he is now too poor to impart. Could he have started where in all probability he will have to leave off, he might have obtained wealth and independence, which now he will have to leave as a legacy to another generation. In view of these considerations, what is the dictate of duty in our future treatment of this valuable industrial interest? Other states have gone far in advance of our own in this department. Michigan has, in connection with her agricultural college, an apiary managed by a competent practical agriculturist, whose observations are recorded and published, and whose methods of treatment of the little insect are always open to the inspection of learners.

The state of Tennessee has followed the worthy example of Michigan. This department, in connection with the agricultural colleges, should be, and will be, if successfully managed, not only selfsustaining financially, but a repository of demonstrated facts and scientific knowledge, to which the public should have full access, and bee keeping will thereby be raised to the rank of a surely remunerative pursuit, instead of a hap-hazard speculation.

Now, if the State Agricultural Society of Wisconsin should so

far interest itself in this enterprise as to ask by formal resolution the Board of Regents of the State University to establish an apiarian professorship in connection with the agricultural department of the State University, we think it will have done no more than the bee keepers of Wisconsin have a right to expect of them as guardians of all industrial interests. Such a department would not only be a source of scientific knowledge, but a financial success, and shortly become to the university a source of revenue. Let it start with an apiary of moderate size, say fifty or one hundred swarms, and it will even pay a large interest on the investment from the first year. There are many questions yet to be solved by careful experiment, some by chemical analysis, of vital interest to bee keepers, such as foul brood, its cause and cure; artificial comb foundation; the best method of wintering bees, and the best hives for given purposes, etc., etc. I venture the assertion that the bee keepers of Wisconsin will spend in the aggregate one thousand times as much money in perhaps vain efforts to solve the artificial comb foundation problem now before them, as the apiarian department here alluded to would spend in accomplishing the same end, were such a department organized and working for that purpose. It is true in Michigan the Agricultural College is entirely separate from the State University; but that makes no difference.

I will close this appeal with a short quotation from the postal card of Prof. A. J. Cook, of the Michigan Agricultural College: "I am professor of entomology, and in that connection have charge of our apiary, and give a series of lectures in bee culture. Bee keeping is one of the separate departments of the college. The students like it so much and it pays so well that it gets many favors."

Hon. Matt. Anderson said he had listened with pleasure to this paper, and he hoped it would stimulate more of our farmers to keep bees. The work of caring for them was light, and could be done by women and children. He had twelve swarms which had gathered the last season one thousand pounds of honey. Clover and buckwheat produced a large quantity of this sweet, and with the extractor it could be taken from the comb and the latter preserved for refilling.

Adjourned till 2 P. M.

Afternoon Session.

Secretary Field stated that all of the railway companies of the state to whom application had been made, had generously offered to return all attending this convention at one-fifth rates, and that he would issue certificates entitling them to such reduced fare upon application, at any time during the continuance of the convention.

Discussion on Bee Culture continued.

Mr. G. W. Sanford, of Middleton, a practical bee raiser, was called upon to explain his manner of managing bees. He said the subject had been too long neglected — there was more profit in bee raising than in the dairy business. To secure success, the bee raiser must avail himself of the improved hive, with movable frames; must get strong stocks of bees and not allow them to swarm, but place empty hives so that they could occupy them — taking out the honey when made — at the rate of twenty pounds per week from good swarms, when flowers are plenty. White clover is the best feed for bees, better than buckwheat. The queen bees are propagated by artificial means, the manner of which he described. He uses the honey extractor, which he made himself, to extract the honey, and preserve the comb, thereby making a great saving. The honey is extracted by centrifugal force, the frames being so placed as to give them rapid motion around an axis. A good swarm of bees is worth \$10, and he insisted would bring more net income than a good cow.

CONDITION OF THE DAIRY INTEREST IN WISCONSIN.

BY HIRAM SMITH, SHEBOYGAN FALLS.

In order to acquire an intelligent comprehension of the condition of the dairy interest in this state, it will be necessary to go back to its introduction and early history. Thirty years ago, neither Wisconsin or any other western state was considered a dairy country. The emigrants from New York, Pennsylvania and Ohio, who settled in the northwest, had some knowledge of dairying before leaving those states, but did not come with any view of engaging in that enterprise here, and it was not until the romance of getting rich by raising

grain had worn off, and the fact began to stare us in the face, that instead of farmers becoming rich by raising grain, the land was fast becoming poor. It was this consideration, perhaps, more than any other, that led to the discussion of the subject of dairying. It was talked about, experimented upon, not always with satisfactory results, for at that time but little scientific knowledge in regard to cheese making had been discovered. Good and poor cheese were alternately made, without knowing the real cause of either.

To acquire a scientific knowledge how best to accomplish any given object, looks to many persons formidable, and difficult to obtain, but familiarity wonderfully simplifies the process. To illustrate: It takes twenty pounds of good hay per day, to supply the ordinary cow with nutriment and to keep up the proper animal heat, if kept in comfortable stables and properly cared for, but if the cow is exposed to cold storms of snow or rain through the day, and forced to shiver in a cold stable through the night, it takes an additional amount of hay, which is exclusively used for fuel to keep up the animal heat. From experiments, it has been proved that it takes from ten to fifteen pounds (according to the severity of the season) of hay per day extra, to winter a cow on this cold and exposed method, than it does on the warm and protected system. The one is the hap-hazard and ignorant way, and the other is the scientific treatment. You will readily perceive that it takes much more time to cut the hay than it does to learn the scientific method, besides the latter is much more comfortable for the cow, and adds largely to her net profit. Every important feature of the dairy enterprise should be conducted on principles that science and successful experiment have demonstrated to be correct. The best method of cultivating the various kinds of grasses, soiling food and root crops, should be accessible to every dairyman, as they enter largely into his profits or losses. The selection and treatment of the best breed of cows for the dairy should be definitely understood, as well as what kind of hogs will thrive best on sour milk and whey. The most improved method of manufacturing butter and cheese, the construction of curing-rooms, and milk-rooms, so as to control the temperature, the subject of imparting heat, and the necessity of guarding against an excess, are of vast importance, and but little understood. A proper understanding of the above men-

tioned subjects, and many others of less importance, have a notable bearing on the profitable pursuit of the dairy enterprise. A thorough investigation of these subjects would be of great advantage to all connected with dairy pursuits, but the necessary expense is far beyond the reach of private enterprise, or the uncertain method of individual subscriptions.

The present and rapidly increasing importance of this enterprise to the people of the state, and the financial advantages certain to accrue, in the tangible form of increased taxable property, wherever dairy farming is introduced, is little understood. It requires, in addition to the property already existing, about 150 cows to every section of land, and to every township of thirty-six sections, over 5,000 cows. These are annually assessed at about \$20 per head, aggregating to every such town an increase to the assessment of \$100,000. This view of the case only has reference to permanent investments,



IMPORTED JERSEY COW "FANNY."

Property of J. M. COBB, Beloit, Wis.

but to this should be added the increased value of the products obtained, as well as the preservation of the fertility of the soil. This branch of industry has become of sufficient importance to well deserve the attention and encouragement of the legislature of our state. It is but manifest justice that they should assume the cost of printing the reports of the State Dairymen's Association, as it now does of the Agricultural and Horticultural societies. Our association is put to great labor and expense every year, in procuring essays and papers from prominent scientific men and practical dairymen, cattle breeders, and successful cultivators of the various crops that enter largely into success in dairy farming. The funds

of our association are altogether too small to print in sufficient fullness those valuable papers, and the discussions upon them, and to send them to the class of persons that would most profit by their perusal. But you may say that this class of persons ought to attend these discussions, and contribute to the funds, so that these reports might be printed and distributed by the society. Granted that ought to be the case; but can any one tell how this can be accomplished? Look around this room; are there enough now in attendance upon this interesting agricultural convention, at one dollar each, to print the State Agricultural Report? You will readily perceive that it would not amount to a sum sufficient to buy the covers in which it is bound. It is one of the unsolved problems, how to induce the mass of the people to attend meetings of this kind. I will venture to say that no one who has labored long and earnestly, and at times hopefully, will attempt to tell. Fruitless efforts are too fresh in their memory, to have any doubt of the result. Perhaps we ought to be content that a sufficient number have the enterprise to meet annually to take counsel together, relate their experience of the year, their successes and failures of certain experiments, their discoveries and observations, and these embodied in a report are of sufficient value as an educator of those unable or too dilatory to attend. This class of persons will read, and many of them profit by what they read, if published free, especially if it relates to business in which they are financially interested. And everything that increases the intelligence and prosperity of an individual, or a class of individuals, is a direct benefit to the state.

The contemplated reports which we are desirous of placing before the dairymen of the state, and all others who contemplate becoming dairymen, will contain a detailed statement of the method pursued in manufacturing the cheese and butter that took first premiums at our State Fair, and was awarded medals at the Centennial Exhibition. Much of the interesting material, now in the hands of the secretary of our Association, will have to sleep the sleep of death, for want of funds to publish, unless the legislature of the state recognize the justice of this long delayed claim, to publish this valuable report. We do not ask it as a donation, but hope the legislature will see in it a financial advantage to the people of the state, to encourage an enterprise, the proceeds of which now reach

over four million dollars, a large share of which goes directly to Europe, in exchange for gold, and so far as this enterprise spreads in our state, is certain to create taxable property that will more than compensate the outlay asked for. A better understanding of the most approved method of manufacturing butter and cheese than now prevails is imperatively required, to reap the full benefits of this enterprise, and the information can be obtained nowhere else so cheaply, and when obtained there is no doubt it would add from one to three cents per pound to most of the cheese sold, and not less than five cents per pound to nearly all the butter made in the state. I would not detract in the least from the value and importance of fish culture, or question the wisdom of furnishing state aid to further that enterprise. It is both wise and timely, but compared with the dairy interest to the people of the state, it is of much less importance, for it adds scarcely anything to the taxable property of the state, and is not expected to bring in millions of British gold for the product obtained. I hope these suggestions may receive consideration, and some plan be devised that will improve the quality and increase the quantity of dairy products, and Wisconsin be placed permanently in the front rank of dairy states.

Secretary Field asked Mr. Smith to state to the convention how Wisconsin cheese products compared with other states at the Centennial Exposition.

Mr. Smith: Wisconsin stood higher than any other state in the Union, and the number of awards to the state on cheese was 95. Said he had received many applications for Wisconsin cheese which he could not supply; that the demand was never better than the last autumn, and he believed it to have been in consequence of the high standing of our products at the International Exhibition.

Mr. Hoxie, Cooksville: Would you brand your cheese Wisconsin?

Mr. Smith: I have never been in favor of branding. New York dealers had sold Wisconsin cheese under New York brands. Dealers know how to manage that.

Mr. Gill, Green County: Thought a commission might be established in England to sell our cheese products with good results to the manufacturer, and asked Mr. Smith to give his ideas upon that

subject; also if such course would not do away with the expenses of middlemen.

Mr. Smith thought middlemen necessary.

Secretary Field said he believed middlemen could sell to better advantage than the producer, because they made buying and selling a business, and could therefore afford to pay as high prices as the producer could obtain himself, and still make a living profit.

Mr. Hazen was of the opinion that cheese makers could often do as well to sell their products in New York as to ship to England. Heavy New York shippers could obtain better prices in England than small buyers.

Mr. Wilder said he had had some experience in shipping. Had sold forty tons in a season, and had done better to sell to middlemen than to ship on commission.

Mr. Smith spoke in the highest terms of the practical papers read and discussed at this convention, and at the meeting of the Dairy-men's Association. Cited a case of a Mr. Gibson, of Waupaca, who had never made cheese, but who followed the directions given in papers, which had been read and discussed at the dairymen's meeting, and produced cheese which took the highest award at the State Fair.

CHINCH BUGS—HOW TO EXTERMINATE THEM.

BY LEWIS CLARK, BELOIT.

To conquer a nation, it is sometimes necessary to burn towns and cities, blockade harbors, turn rivers from natural channels, drain canals and destroy railroads. Apply this kind of warfare on our enemy, the chinch bug.

Treat them as enemies, not as friends,

We feed our friends, if we have the means.

In war it is considered good generalship to bring the enemy to terms by cutting off their supplies, thereby starving them out.

The question arises, How shall we apply this method to this little pest, the farmer's present great enemy? All created beings require

food to sustain life, the lowest as well as the highest. Man has his particular kinds, animals have theirs.

If man is confined where he can get only wood, he soon perishes; but the same wood feeds the borer. The manufacturer of silk feeds the worms on mulberry leaves, but if he only puts oak or other leaves before them they die. The lion wants meat, and the beasts of the field grass.

Now, then, if the chinch bugs are our enemies, why keep putting into the ground, year after year, seed that makes just such food as they subsist upon, viz., barley and wheat? Previous to about 1865, I often remarked that I thought these bugs destroyed as much as was left to support the family and keep the stock; the latter consisting of 400 sheep, with other stock in cattle, horses and hogs.

About the time referred to (1865) these bugs, in this vicinity, disappeared, and for some time we enjoyed their absence. Gradually they returned, and this year have done immense damage. My theory, in short, is to stop raising barley and spring wheat. Barley appears to be a number one food for them, and in the absence of that, wheat is taken as a substitute. Winter grain is generally too early for them. Oats have never been injured by them, except when mixed with wheat. I would apply the same rule to any other crop that might be taken by them as a substitute. When we have become entirely rid of them as a community, sow again the wheat and barley, so that we can eat our own flour and drink our own lager. After striking from the list of products to be grown on our farms, barley and spring wheat, we can have just so much more space to put in grass, corn, oats, buckwheat, or anything else we may choose to substitute, and I would here suggest that we farmers experiment a little carefully on raising a small amount of winter wheat, taking ground well protected against winds, and giving it a good summer fallowing according to the Genesee country plan, in western New York, which is to plow two or three times during the summer, and sow last of August or first of September.

In support of my theory, I will call attention to some facts. About forty years ago, the Hessian fly injured the wheat crop in some of the New England states, so much that they ceased to try to raise it, and imported their flour. In a few years that pest was starved out, and they raised their own bread again; that is, those who had suitable grounds. In the great winter-wheat region called

Genesee, in the state of New York, about thirty years ago, the midge and weevil were so destructive to that crop that they were compelled to abandon the raising of it. In a few years these wheat enemies were obliged to give up and say quit, for want of sustenance. They are now, and have been for years, raising number one wheat in that section. They are saying to us "Badgers," that they would not like to live in a state that did not raise better wheat. Upon land from which I saw the timber cleared sixty years ago, they are now raising thirty bushels of extra wheat to the acre. Since the return of these bugs, after their exit in 1865, I have been testing my theory to some extent, and with much better success than I could have anticipated, when working single handed or alone. To be fully successful, there should be an organized community working together. I have sometimes said, "I thought it might be proper to have some legislation on the subject," as we have got in the habit, these latter years, of twisting the constitution some. The farm contains about 240 acres, and is well situated for my experiment. It is bounded on the west by Rock river, by timber and pasture; on the north by a road, timber and pasture; on the east and south by a stock farm, where a portion all the time is more or less into grass.

This has enabled me, most of the time to arrange my corn fields and a small piece of wheat, so that they will generally be surrounded with grass and oats. In 1874 my neighbor had barley on the line opposite a piece of corn. The bugs came through the fence. I cut the corn, throwing it on the ground. They made a right angled turn into a piece of fall sown rye, and ate up a portion of it so close to the ground that it did not grow again. Neighbor number two had this season about four acres of wheat on extra good ground, where barley grew last year, from which he harvested very little, it being used up by the enemy. About twelve rods from said field there was a small piece of corn in a garden. The space was covered with grass and trees, but it did not save said corn from their ravages. On a piece of seven acres of wheat in the center of the farm I did not see a bug. It had corn upon one side and grass on the other. I did not, this season, see a bug in my rye or oats, and have not, to my knowledge, except in the garden referred to, had a hill of corn injured by them. A tenant planted about thirty acres of corn upon some new breaking. On a portion that was not

tilled, some bugs were seen among the husks. I was not certain whether they bred or flew there. The former might have been the case, on account of the land not being cultivated.

They like to sap the juice from green corn stalks, but I am well satisfied they do not, as a general rule, breed there. Either because it is too late for them, or otherwise, the cultivation prevents the breeding.

A neighbor, number three, raises corn largely, and barley a little less in acreage. His wheat was entirely used up last year, and in order to raise his bread this, he bought eighteen bushels and mixed with oats, which sowed a portion of his oat field. The bugs ate out all the wheat, and then ruined the oats as far as the wheat went, but the oats sown clear were not injured. So I am inclined to think they do not breed in oats, and that they are not natural food for them, but if it should so prove that they will take oats in the absence of other grain, I would strike them also from the list. This same number three neighbor told me a few days ago that he thought the bugs going from the barley ground into the corn had damaged it more than the barley was worth, it (the barley) being about twelve bushels to the acre, and poor.

The crops upon my farm of about 240 acres, this year, are about as follows: Corn, 70 acres; oats, 16; wheat, 7; rye, 7; buckwheat, 4; and the balance to meadow, pasture, timber, orcharding, stock and other yards, grounds for buildings, gardens, etc. I have cultivated this farm thirty years, and never sown barley, and very little wheat, keeping it as a stock farm, keeping what I raise.

After closing my statement of facts, and my theoretical ideas, a question might still arise, what shall we put upon our farms to pay hired help, taxes, and other current expenses? Will say more stock, more meadow and pasture, more corn, more oats, if they stand the test; more buckwheat, adding almost anything that does not feed and propagate the enemy. Turnips, millet, hungarian, etc.,—watching closely, and striking from the list when found wanting. We can raise a few potatoes by using Paris green.

I have heard of stopping the ravages of the chinch bug by using coal tar, by making the ground hard and by making it soft. These operations for general good appear to me about like trying to dip a mill pond dry with a ladle, instead of tearing away the dam.

In conclusion, if my plan, or a similar one, could be adopted by

Rock county, (if no larger organized territory), could it not be carried into effect, through our county government, this agricultural association, or the grange and farmers' club organizations?

Since the last return of this enemy, I have often been asked if "the bugs were doing me much injury."

My reply has been, "I do not raise them any more."

Mr. Allen didn't believe in raising chinch bugs; would prevent by making conditions unhealthy for them; by packing and rolling the land.

PRINCIPLES OF STOCK FEEDING.

BY W. W. DANIELLS, M. S.,

Professor of Agriculture and Chemistry, University of Wisconsin.

The thorough treatment of the subject* under discussion would require, besides the question of the "value of milk, butter and cheese as food," the consideration of the broader question of "the health, feeding and care of dairy cows." In the twenty minutes assigned me in your programme, I shall confine myself more particularly to the feeding of cows, knowing full well that in so short a time, I can call attention to but few of the principles bearing upon this subject, which are alike in accordance with the teaching of science, and with the best practice.

The successful dairyman regards his cow as a machine that is profitable or not, in proportion as she is able to convert much or little crude material, as hay, straw, grass, roots, grain, etc., into milk. Any other machine requires the expenditure of force to overcome its inertia, and the friction of its parts, that is, to put it and keep it in motion, and it is only the force exerted in excess of this amount that is available for useful purposes. So does the cow consume force to carry on the vital processes of her system, and it is only the materials consumed in excess of the amount required for this purpose, that can be converted into useful products. Hence the most profitable cow is the one that, while requiring the smallest

*The writer was one of three, appointed to read papers at the annual convention, upon "THE DAIRY COW AS A FOOD PRODUCER."

quantity of food for her individual use, can, in addition to this amount, convert the greatest proportion of food into milk.

Suppose two cows each to require twenty pounds of food-substance to supply the wants of her system, and keep her in a healthy condition, and that in addition to this amount one can digest and convert into milk twenty pounds of food-substance and the other but ten. The former would be twice as profitable as the latter, because, with an equal outlay of capital, she produces twice the results. As a machine, she does twice the useful work.

That I may be clearly understood upon this point, allow me to elaborate a little more fully. The functions of food consumed by a full grown animal are:

1st. The performing of vital work, or that necessary for maintaining the circulation, digestion, respiration, etc., and the maintaining of animal heat.

2d. The performing of useful work, either muscular exertion, as in the case of draft animals and beasts of burden, or in the manufacture of useful products, as milk, meat, wool, etc.

The first class of functions are of much importance to the animals themselves, and hence it is to their maintenance that food is first appropriated. Yet it is the second class of functions only that can yield profitable returns for food, capital and labor expended. It is consequently necessary for the dairyman to keep in mind the conditions requisite for obtaining the greatest value in useful products for the food consumed by his cow. The first condition pertains to the animal herself. Milk is the product sought. Hence, other conditions remaining the same, that animal will be the most useful that converts all the food not needed for her own sustenance into milk. Having animals with this tendency, how can they be kept in vigorous health, in order that every organ may perform its appropriate function, and especially that the digestion may be perfect, not only that the animal may obtain from a given supply of food the greatest possible quantity of milk, but also that the largest amount of food may be digested. For, as before stated, the most profitable cow is the one that digests the most food in proportion to that required for her own physical wants.

One of the essential conditions then, to successful practice, is the maintenance of the condition of the cow when giving milk. In order that this may be done, the digestive portion of their food must be

equal in amount, and must contain all the ingredients of the milk produced, in addition to that portion required for her own support.

This is a very commonplace remark, yet, without doubt, it is one of the weakest points in the practice of American stock raisers. Very few men, I fear, having dairy cows in charge, consider that each 100 pounds of milk requires 4.8 pounds of nitrogenous substance, about the same of sugar, 3.1 pounds of fat, three-tenths of a pound of phosphates, mostly phosphate of lime, and as much more of other mineral matters, and know whether the food furnished is sufficient to supply these amounts, in addition to that required to supply the bodily wants of the animal.

But the power of these same animals to produce milk is as dependent upon the supply of these materials, as is the miller's power of producing flour upon the grain supplied him. Like the miller, the cow creates nothing. The power of both is limited to taking certain materials, and changing them from one form into another, in which they are capable of use by man.

Pasture-grass furnishes the different food ingredients in nearly the proportion required, but in this state, artificial food must be at least partially depended upon by dairymen, for eight months of the year. The more nearly this artificial food resembles pasture-grass in composition, the more easily and thoroughly will it be digested, and hence both so far as the use of the animal power in digestion, and the waste of material are concerned, the more economical it will prove.

During the months when the short pastures are supplemented by soiling, there is no great difficulty in furnishing food having nearly the composition, succulence, and ready digestibility of pasture-grass. Such food is found in the various soiling-crops, now so commonly used — clover, rye, oats, lucerne, fodder-corn, etc.

The want of winter food having the succulence, chemical composition, and ready digestibility of the grasses, greatly complicates the question of the economical feeding of dairy stock. For no one of these qualities can be neglected without sacrificing, to some extent, the efficiency of food.

For many years, at the Agricultural Experiment Stations of Germany, able chemists have been at work, endeavoring to obtain the data which would explain the intricate relations existing between the chemical composition of food and its economical value.



JANET.

Ayrshire Cow, owned by CHESTER HAZEN, Ladoga, Wis.;

Many things have been learned, and we are more nearly in possession of that knowledge upon which a rational system of feeding cattle may be based than formerly. But, as "all is not gold that glitters," so not all has proven to be true in practice that science has first announced as truth. It was at one time supposed that a comparison of the chemical composition of different varieties of food would enable one to tell their relative values, and tables were formed, giving the quantities of one food that must be substituted for a given quantity of another, usually taking one hundred pounds of meadow hay as a standard. This theory of nutritive values was a very plausible one, and is based upon a sure foundation of truth, yet in practice it has failed to prove itself the valuable aid it was at first expected to be.

For this there are several reasons: 1st, two samples of hay may differ from each other but slightly in chemical composition, yet on account of the time of cutting, method of curing and storing, one may be much more valuable than another, because it contains a larger percentage of digestible material, for this must needs be taken into account, in any proper estimation of the value of food. Its nutritive value is so largely dependent upon the condition of the soil upon which it grew, its method of cultivation, time and method of harvesting, and the way in which it is served up, that no variety of food can be taken as a standard, and no other variety could be found of sufficiently constant nutritive value, for accurate comparison, were a standard to be obtained.

2d. Animals, like human beings, have their idiosyncracies, one being able to relish and digest food that is not as acceptable to another.

3d. Whenever the functions of life, either animal or vegetable, form an element affecting the determination of value in a series of experiments, it is found that science cannot readily draw exact conclusions. It points the direction in which truth lies, however, and it is wise to search for truth by following its guiding hand.

Yet, experiment and practice agree in pointing to the conclusion that there is a close relation existing between the chemical composition of food and its nutritive value, although it may not be possible to express this relation by precise figures. I desire to call your attention to the results of some scientific experiments that may enable you to see how chemical composition of food and its nutri-

tive value are related, and which I trust may be of some use in aiding you toward a solution of the problem of the economical feeding of stock.

Chemistry teaches that cattle-food contains, besides a small amount of mineral matter, four classes of substances. First, the class containing nitrogen, called nitrogenous substances or albuminoids. Second, fats; third, starch and sugar; fourth, fibre. Of these, the nitrogenous substances (albuminoids) are considered most valuable, as they are capable of performing certain functions in the animal economy, for which the other classes are not fitted, and they are also present in plants in very small quantities and hence are difficult to obtain. Of the other ingredients, fat is the most valuable, as it aids the digestion of the other classes, especially of the fibre. Starch, sugar and fibre are usually classed together as carbohydrates, and of them the fibre is least valuable, because least digestible, and all of them perform similar functions in the processes of nutrition.

Not only is it true that food contains these four classes of substances, but it is found to be true that there is a certain proportion in which they may be fed most economically. In experiments that were conducted at Weende, Germany, upon oxen at rest, it was found that they maintained their condition, when fed a daily ration containing, for each thousand pounds of live weight of the oxen, nine-tenths of a pound of albuminoids and seven and one-fifth pounds carbohydrates—in this calculation, one part of fat is reckoned as equal to two and one-half parts carbohydrates—the ratio of albuminoids to carbohydrates being one to 7.9.

Upon another ration containing 1.95 pounds albuminoids and 7.39 pounds carbohydrates, the proportion being one of the former to 3.8 of the latter, the condition of the cattle was in no way improved. It was found that when the proportion of albuminoids to carbohydrates was increased to a greater proportion than one pound of the former, to 7.9 of the latter, there was waste of food, the albuminoids not being all digested.

This experiment was continued upon the same oxen for six months, with six different sets of daily rations, each having a different ratio of albuminoids to carbohydrates. But the first ration above given, having nine-tenths pounds albuminoids, and $7\frac{1}{5}$ pounds carbohydrates for each one thousand pounds live weight, was the

cheapest, and the oxen flourished as well upon it as upon rations much more costly, having the albuminoids present in greater proportions. The proportions above given are of the total crude material; the proportion of digestible albuminoids to carbohydrates was as one to twelve. Hence, we may conclude that oxen performing no labor require for one part of digestible albuminoids twelve parts of digestible carbohydrates. If animals are performing work, giving milk or storing up fat, the proportion of albuminoids must be increased. With milch cows, it has been found by a series of experiments, similar to those above stated, to be one pound of digestible albuminoids to $5\frac{1}{2}$ of carbohydrates.

These experiments indicate, if they do not fully prove, that animals digest these different food-substances, the albuminoids and carbohydrates, in proportions that are constant when performing the same kind of work, and that when fed in proportions differing from those obtained by experiment, they are less thoroughly digested, and in so far there is a waste of fodder.

Again, a large number of carefully conducted experiments have shown that, while there is quite a wide range in the requirements of different animals, a milch cow will, on the average, thoroughly digest daily from 24 to 28 pounds of dry food for each thousand pounds live weight of the animal. (By dry food, is meant the residue of food, hay, grain, etc., that would remain after expelling all moisture by subjecting it to a temperature of 212° F., that of boiling water.)

This 24 to 28 pounds of dry food should contain about one-ninth its weight of digestible albuminoids, one-half of digestible carbohydrates, and one-thirtieth of fats. These numbers may not express, with mathematical exactness, the amount of food required by animals, but being the results of carefully conducted experiments, during which the animals were frequently weighed, the amount of all food accurately taken, the percentage of albuminoids, fats and carbohydrates in the food, and the amount of each digested, determined by chemical analysis, they come with a weight of authority that entitles them to the careful consideration of all who are feeding stock. They furnish the data upon which a rational method of feeding may be based, and it cannot be wisdom on the part of stock owners to continue in the old way, regardless of these sources of instruction.

A machine is valuable in proportion to the cheapness of the energy it exerts, not in proportion to the amount of that energy. So with this milk-producing machine, the cow, the most profitable cow is the one that produces the cheapest milk, not necessarily the one that produces the most. And the man who is able to so feed his cows that they will produce the greatest quantity of milk from a dollar's worth of food will, other conditions remaining the same, be the most successful in his business.

It being true then, that food is most thoroughly digested, when the different substances of which it is composed bear the relation to each other above stated, it must as certainly be economy in the feeding of milch cows to ascertain the composition of their food, and regulate that of the daily rations fed, by combining varieties of food having different chemical composition, in such a manner, that the mixture shall contain the different food-ingredients, in the proper proportions. If a coarse fodder, as straw or the marsh grasses so largely produced in this state, which is poor in nitrogenous matter and fats, is to be used, in order that the greatest proportion of it may be digested, some food rich in these ingredients should be fed with it. Or if a food contains more than one part of digestible albuminoids to five and one-half of carbohydrates, it will then be economy to give with it, some cheaper fodder, poor in this valuable food-ingredient, in amount sufficient to reduce the proportion in the whole ration to that in which digestion takes place. In order to fully realize the economy of this method of feeding, it is necessary to keep two things in mind: first, that the nitrogenous portion of food is the most valuable, and hence the necessity of avoiding the waste; and, second, that it will only be completely digested when fed in no greater proportion than that above given.

It is also true that when fed in smaller proportions, the carbohydrates will not be completely digested, yet as the loss of these is slight, compared with that of the same quantity of albuminoids, it is the wiser course to see that there is no excess of these in the rations given. One great difficulty in putting these principles into practice is in finding the composition of food. Certainly no one can afford to pay a chemist for analyzing his cattle food.

Fortunately there is no necessity for this. Both grain and coarse fodder, when grown and cured in the same manner, have very nearly the same chemical composition. These have been analyzed, and the results condensed in tables.

A collection of such tables may be found in Johnson's "How Crops Grow," a most useful book of reference, that should be in the library of every farmer. By the use of these tables, rations containing the proper proportions of albuminoids and carbohydrates may be quite readily formed, by properly mixing different varieties of fodder. Such a course, accompanied with careful observation of its effect upon cows, modified as experience shall suggest, can not fail to increase the returns from a given quantity of food, even though it has not the precise composition given in the tables used.

Another important question, closely related with the subject under discussion, is, the quantity of food animals should be allowed. Ought a cow to eat all she will if food is kept before her, or is there a limit to her digestive powers, beyond which it is waste to feed her? Experiments designed to test this question have been tried in Germany. Prof. Atwater (and I would commend to all farmers his articles on "Science Applied to Farming," in the *American Agriculturist*), gives the following account of a trial at Moeckem, made by the celebrated Dr. Kuehn, with four cows. "During one period of several weeks, they received all the green clover they would eat. During another, a smaller ration was given, and a part of the clover was replaced by straw. The fodder and milk were carefully weighed and analyzed. Every precaution was taken to insure accuracy.

"The rations in the two periods were as follows:

KIND OF FOOD.	The organic substances contained.	
	Albuminoids.	Carbohydrates.
	<i>lbs.</i>	<i>lbs.</i>
(1) 87 lbs. green clover, and 6.7 lbs. barley straw.....	3.8	17.8
(2) 123 lbs. green clover.....	5.6	15

"The result was that the cows gave as much milk, and milk as rich in fat (butter) and caseine with the smaller ration, of which a part was straw, as they did with the larger ration of pure clover. The cost of the milk, as based upon the value of the fodder, was just about 50 per cent. more with the clover alone than with the mixture of clover and straw. The 3.8 pounds of albuminoids was sufficient,

and in the pure clover, with its 5.6 pounds, there was a waste. Part of this waste was due to the *ad libitum* foddering, but a part was due to the unnecessarily large amount of albuminoids in the green clover."

This experiment confirms what I have been stating, that there must needs be in cattle food a definite relation between the quantity of digestible albuminoids and carbohydrates, 1 of the former to $5\frac{1}{2}$ of the latter, in order that the greatest returns may be obtained from the food given, and it also shows that too much food may be given to cows, the limit being the powers of digestion and conversion of the food into useful products.

There is but one other point bearing upon this very broad subject of the economical feeding of stock, to which I can allude in the time allotted me. It is the saving of food by protecting animals from the cold and the storms of our somewhat rigorous climate. In a paper read by me before the Northwestern Dairymen's Association in 1873, on "Feeding, Watering and Sheltering Stock," this question was more fully discussed than it would be proper to do on the present occasion. But it should never be forgotten by dairymen that the maintenance of their cows at a temperature of 98° F. is not a matter of choice with them. Nature will keep the system at this temperature as long as healthful life remains, and if the food furnished is not sufficient to maintain it, the fat and muscle of the animal will be consumed for that purpose. The maintaining of animal heat, and the formation of useful products are processes directly opposed to each other.

One is carried on at the expense of the other. Both are supplied from the food digested. But the same food cannot perform both offices, and only the amount not required to maintain the animal temperature can be converted into useful products. It follows consequently, that the greatest amount of milk can be obtained from a given quantity of food, only when the animal requires the smallest portion for maintaining its temperature. Protection from storms, then, and keeping cows in warm stalls, are equivalent to supplying them with a greater quantity of food, and he who does these most effectually, other conditions remaining the same, will produce the cheapest milk.

Earl Ducie, of Whitfield farm, England, conducted the following experiment, to test the effectiveness of shelter. Two flocks of

sheep, of one hundred each, were fed under like conditions, except that one was furnished a covered shed under which they could run, while the other flock had no shed. The experiment was begun October 10th and continued until March 10th—five months. During this time, the sheep having no shed ate one-fourth more than those having shelter, while at the same time the sheltered flock increased on an average three pounds more per head than the others.

If shelter during the mild winters of England makes a difference equal to one-fourth the quantity of food consumed, it will prove a still greater economy to furnish warm stabling in our much colder climate.

It is true also that food and water given while cold, besides requiring the expenditure of food to warm them, cool the stomach and check digestion, and if they are given in large quantities for a considerable time, tend to produce disease of the digestive organs, and hence seriously affect animals for any useful purpose.

Several series of experiments have been made in France and Germany to ascertain the influence of the quality of food upon the richness of the milk produced. The result of these experiments in every case has been to show that, while the quantity of milk is greatly affected by the kind and amount of food given, the quality of milk is not appreciably affected by the food. For richness in either butter or cheese forming ingredients, the individual cow must be relied upon.

Allow me to recapitulate the points touched upon which affect "The Cow as a Food Producer."

1st. Quality of food appears not to affect the quality of milk. A "butter cow" or a "cheese cow" must be so from her own inherent qualities, and cannot be created by giving rich food.

2d. Protection from cold and storms saves food, and enables cows to produce more milk than when unprotected.

3d. An average milch cow requires for each 1,000 pounds of live weight, from 24 to 28 pounds of dry food substance per day.

4th. The proportion between digestive albuminoids and carbohydrates, in the food of milch cows, should be $5\frac{1}{2}$ of the latter to 1 of the former.

Mr. Anderson said he did not indorse the scientific experiments quoted in Prof. Daniells' paper; believed that the experience of

practical farmers, was that good, rich, nutritious food produced rich, excellent quality of milk.

Prof. Daniells said he was glad to be on the practical side. Experiments made by chemists in France and Germany had fully established the fact that quality of food did not appreciably affect the quality of milk, only the quantity.

Mr. Hazen said in making careful experiments with the lactometer, he had become satisfied that cows kept upon upland pasture would produce three to five per cent. richer milk than the same cows kept upon marsh land.

Mr. Porter desired the professor to say whether good butter could be made from straw and marsh hay only as food.

Prof. Daniells—Experiments carry conviction. The return of butter on poor feed would not affect quality, only quantity. The color might be affected favorably by rich food.

Mr. Wood sustained Prof. D.'s views. Had read the account of experiments, and believed they established the point. Milk might be affected in color, and perhaps in taste, but its absolute quality was not changed by the quality of the food—that was only affected by the milk producing qualities of the cow.

He did not think the test with the lactometer an infallible guide. Chemical experiments must be more accurate.

President Stilson desired Mr. Hazen to state to the convention whether his product of milk was greater upon upland than on lowland pasture.

Mr. Hazen—I get more milk from lowland pasture with the same kind of grass as the upland.

Adjourned to 7½ P. M.



Evening Session.

WHAT I WOULD LIKE TO DO.

BY J. S. STICKNEY, WAUWATOSA.

Do you know of anything more quieting to one's overwrought nerves, more soothing and comforting to homes and expectations not fully realized, better calculated to bridge the vexations and un-

pleasant things of the present time, and carry us over into the future sunshine so agreeable to all, than some of the day dreams, commonly called "air castles?"

Do you know of any human beings more in need of such consolation than the horticulturists of Wisconsin? And if required to select the most miserable among these, could you fail to answer, as with one voice, the Wisconsin nurserymen? Being one of this unfortunate class, I crave your indulgence if I dream some things not very practical or easy of realization.

Poets sing the praises of choice fruits. Doctors tell of their medicinal virtues. The spies sent into Canaan brought back grapes, pomegranates and figs. The first and pleasantest things told of a new country are of its delicious fruits. All this convinces me that to enjoy health, wealth and happiness, I must have an orchard. As this is not the season to plant, I can only think how I would like to do it. To fully satisfy my needs, I think the part planted to apples should be about forty acres, and to give me the largest returns with the least trouble in gathering or marketing, it should contain no more than six varieties.

First in season would be Duchess of Oldenburg. As this is a slow grower and early bearer, one hundred and sixty trees may stand on an acre; five acres would thus hold eight hundred trees. Utter, Fall Orange, Fameuse, Plumb's Cider and Walbridge would answer very well for my other five kinds. If one or two of these could not be had, I should not hesitate to plant Alexander and Haas in their stead. All these are stronger growers, and must have more room. On thirty-five acres I would plant twenty-three hundred trees, about twenty-five feet apart, making, with the eight hundred Duchesses, three thousand one hundred in all. Five additional trees for each hundred I would also plant in some convenient place, from which to replace any that might fail in the orchard, thus keeping every place filled with trees of uniform size.

Of location I say nothing, except that it should be the best within my reach. Its preparation should be good drainage where necessary, and deep and thorough plowing.

The trees used should be the best I could buy. Notwithstanding the heavy losses we have seen by root killing, I should still hesitate to use crab roots, fearing that my orchard would be smaller in size, its yield of fruit less, and its time of productive usefulness

shorter than with free growing roots. I would sooner trust to mulching and care to carry through the free growers.

Having my orchard successfully planted, its after treatment should be early and thorough cultivation each season, up to July 1st to 15th, and as near as possible to perfect rest thereafter. For a few of the first years, crops of corn, potatoes, or beans may be taken from the land, always returning an equivalent in manure, and always leaving a good space around each tree unoccupied. A little careful thinning of branches in June of each year would give the trees uniform and well balanced heads, and make heavy pruning or the cutting away of large branches unnecessary. Quite late fall plowing, shallow near the trees, would give the roots needed winter protection, put the soil in good condition for early spring working, and would also disturb and largely destroy such insects as had gone into winter quarters in the soil.

Further protection to roots can be given by mulching, but it will hardly be necessary, except when winter sets in, with the soil very dry. At such times mulch early and heavy, or you will be sure to suffer more or less injury.

After five years of this careful culture, some fruit will be produced and the quantity will rapidly increase from year to year. At the end of ten years, and in a good fruiting season, I shall expect lively times, calling for hand work and brain work enough to brighten up and call into play all the talents of those who long for a "larger sphere of usefulness" than they think the farm affords.

I do not forget that insects will be abundant and troublesome; that untimely drouths and frosts will destroy, but my belief is that notwithstanding all this, the same care and effort that would bring success in other things would bring abundant success in this; and I know of no use to which land can be put that would add more to the permanent value of the farm and home.

An abundant fruit crop from a well kept ten year-old orchard of forty acres is something magnificent, and if well handled, its net proceeds would very soon pay for all labor and care during the five or more years of waiting. Such an orchard could be relied upon for a fair income two years out of three, and for an occasional extra yield. It would satisfy me as a source of support, or as an inheritance to leave my children.

My dream of melting, juicy pears has been long continued, run-

ning through nearly thirty years, varied occasionally by something of reality; sometimes by choice ripe Bartletts or Seckels, but more frequently by blackened branches, covered with dead and dying foliage, and seeming more like nightmare than a pleasant dream. Well, the little I have gained is worth something, and I will dream on, hoping to make better progress than heretofore. Thirty dwarf trees I planted last spring, and my intention is to plant a few every spring. I reason in this way: They cost but little, occupy but little ground, and the care is not great; consequently, if all fail the loss is not severe. A few mild seasons may bring them forward to fruiting size, and then a single crop will richly pay for all trouble. The roots of dwarf trees *must* be protected by mulching. The top can be kept very low and compact, and may easily be protected by corn stalks placed around them and securely tied.

A cone-shaped tree, say three feet at the base and five feet high, carrying 50 to 150 Bartletts, averaging twelve to fourteen ounces each, will compensate for some vexatious disappointments.

Five dollars worth of plums per tree I have often harvested, consequently I feel sure of doing it again. With this hope, I last spring planted fifty trees — ten De Soto, five Weaver, ten Winnebago, and twenty-five Lombard. Why did I plant half native varieties? Because I am dreaming that among these there is something valuable; their endurance, productiveness, and perfect hardiness, should and *must* be made useful to us, and we have no right to rest or flag in our efforts until we have an orchard of native plums that shall command in market two to four dollars per bushel, and yield crops as abundant and frequent as the wild ones in our thickets now do. About the possibility of this there is very little doubt, and yet how little we are doing to accomplish it.

Ways and means to destroy the curculio must enter into all our plans for plum culture. Jarring and hand-picking are effectual, but expensive, yet the expense is but a fraction of the value of a good plum crop, therefore the neglect and consequent loss strongly resembles a sort of shiftlessness, that does not deserve success. My neighbor has grown two excellent crops of Lombards, by syringing his trees just as they were fairly out of bloom, and again ten days later, with a strong solution of whale oil soap. This is cheap and easily applied; let us try it thoroughly and report results.

My trees are planted in a block by themselves, with the intention

of confining poultry under them. Richmond, Kentish, and English Morrello cherries are realities with us almost every season, and so satisfactory that we add annually to our orchard, 100 to 200 trees. The larger and sweeter varieties will always flourish best in our dreams. I used to dream of small fruits by the acre; but the realizations of those dreams have been so abundant as to class them among the pleasant, profitable, and well established facts.

I need a vineyard; not to yield rich wines to gladden my heart, for my friend Kellogg says my heart is glad enough without, and that my head might suffer; but I have always been dreaming of big clusters of luscious grapes, so abundant as to be on my table morning, noon and night, for at least three months of the twelve. Can you imagine a more grateful and harmless luxury, and do you really know any good reason why you and I may not enjoy it? If not all to be had from vines grown in the open air, then let us grow a part under glass. A simple and inexpensive structure will answer, and the care and skill needed is not great; after the vines are put up in the spring, the necessary attention would be more like recreation than labor, and the two, three, or five-pound clusters would be a reward worth seeking.

Prominent among our "castles" is our cranberry marsh. One or two hundred acres of sand, peat, moss, and water, afford room and abundant material for cranberries. All we need to do is to *combine them in the right proportions* and under *favorable conditions*, and there is no end to the cranberries we can make. True, these combinations are a little intricate, and results thus far obtained seem a little uncertain, but with the attention and effort now directed to these marshes, there can be no doubt that their products will rapidly increase until their aggregate value shall form no mean item of Wisconsin's wealth; 100 to 200 bushels are often found growing wild on a single acre. What nature, unassisted, has often done on one, two or five acres, by skillful management can and ought to be repeated on forty, sixty, or one hundred acres.

The garden is, or ought to be, a bright and pleasant place in every home. A look into the far too common vegetable patch, with its attendant weeds, would pain rather than please us, but let us not go to the other extreme, and call for so much of labor and skill as to discourage the beginner, or the person of limited means;

rather let our suggestions be so practical that every hour's labor shall bring its reward, and every dollar invested shall bring us a dollar's worth of good. In villages our space must be limited, but one of the pleasures will be to show how much can be accomplished even on a square rod; and if all is neatly and seasonably done, we shall be surprised at the variety and quantity of the luxuries produced.

On our farms, let the garden be a generous acre, the warmest and best we have, deeply worked and liberally enriched; securely fenced from all the quadrupeds and bipeds that may be tempted by its treasures. Let its arrangement be such as to admit of free use of horse and cultivators; then let it be fully occupied with all the good things that can be successfully grown in it, each being the best of its kind, and so managed as to be early in its season. The zest and pleasure of all depend upon having everything well done and promptly on time; and what is better, the labor and expense is less when so done. Who shall estimate the cash value and especially the health value of the table bountifully supplied with a full assortment of crisp, juicy vegetables, and with a succession of small fruits throughout the season? Depend upon it, this acre is the most profitable and valuable acre of the farm.

Trees, majestic in size, beautiful in form, gorgeous in rich bloom and foliage, giving cool and grateful shade, standing on velvety green lawns, on which are groups of flowering shrubs and beds of herbaceous plants and bulbs, these make a dream almost equal to fairy-land, and yet not difficult to realize. In no other clime can we so easily and so perfectly make the lawn with its carpet of green; nowhere else does it remain in such perfection from early spring to latest autumn.

The elms, maples and lindens grown thereon may be less gorgeous than trees of southern growth, but the mind that could criticise or find fault with them must be sadly out of tune. Our evergreens range from the majestic spruce to the dwarf arborvitæ and juniper; and in color, from the light green of the white pine to the balsam and red cedar, all perfectly at home and of easy culture.

Choice flowering shrubs are abundant, and the finest roses, herbaceous plants and bulbs are only limited by the time and money we choose to invest. What, then, shall hinder us from working out this creation of beauty, each in his own home, and in accordance with the room and means at his command?

Now, I would like to gather these scattered suggestions, and concentrate them upon every farmer's home, for here is room and scope for them all. I would do more. I would bring each agricultural interest up to an equal degree of progress. With such development and such surroundings, there is work, thought and improvement for every one.

Some parts of the care and culture of flowers, vegetable and small fruits, are adapted to very young hands, and very young minds will comprehend and take an interest in their production and use. With a little encouragement, the young people would become excellent judges of high class poultry and pet stock, and expert in their management. The keen observation and judgment thus developed would at a later period serve them well when applied to the larger animals. The breeding and management of fine stock, preparation and improvement of soils, suitable rotation of crops, best manner of securing and using crops when grown, when and where to purchase needed supplies, or sell surplus products — these are but advanced steps in the course already begun which will call into play all the faculties of the most active mind.

Young people thus brought step by step from childhood to maturity, through pleasant paths which have not only called for earnest work, but have crowned their efforts with success; and where also they have enjoyed social frolic, recreation and improvement, possibly may find it hard to leave these scenes, and thus be kept from the wanderings to other employments and other modes of life which we so much deplore. Who shall estimate or limit the possible attainments of this progressive course? And what other occupation shall give more of pleasant self-reliance and contentment?

These things, in greater or less degree, are possible to us all. One great element of success is concentrated effort. Exert your whole strength of mind and body to do well the things nearest at hand, and the doing will be but a stepping stone to something larger and better beyond.

Agriculture will be our substantial prose. Horticulture our poetry. While securing the substantial, let us not forget the ornamental, for these beautiful surroundings, planned by our own minds and wrought out by our own hands, bring to us enjoyment hardly attainable by other means.

At the conclusion of this paper, President Steele of Lawrence University, was called upon. He had been placed on the programme for Tuesday, to read a paper on "Diminishing Returns." He had not been able to be here on time, and supposed his time had gone by, so he had not come prepared now to read a paper, but he gave a very interesting extempore address upon the subject, speaking of the doctrine of Mill and other English authors upon political economy, relating to over population and a decrease of the productions of the soil. The history of England did not tend to confirm the apprehensions of these philosophers. Though the population of England had increased eight fold in 500 years, famines were not as common there now as in old times. In this country there was an actual decrease of production upon given areas, but it was the result of bad methods and of robbing the soil for the exportation of products without making any return to supply the exhaustion. Southern soils had been worn out and abandoned, but when the South undertakes and encourages manufacturing, as it ought to, and will, the lands will be restored.

Diminishing returns were going on in Wisconsin. Instead of 30 to 40 bushels of wheat to the acre as has been raised in the state, 14 to 15 is now considered a good crop. This shows there is something wrong. You cannot carry off all your products and keep up the fertility of your land. Lands at the east and south were some of them worn out, exhausted of their fertility and absolutely abandoned, their owners had carried their farms away, and were now seeking new and fertile fields to rob and plunder of their food producing qualities.

Adjourned to 9 A. M., Thursday, February 8.

FEBRUARY 8 — 9 A. M.

Convention met. On motion a committee on resolutions was appointed consisting of Messrs. Stickney, Anderson and Wood.

Secretary Field offered the following resolution, which was unanimously adopted:

"*Resolved*, That it is the sense of this convention that the bill now before the legislature, making an appropriation of two thous-

and dollars to the State Agricultural Socceity, ought to become a law; and that the bill for reducing the number, size and style of binding of the volumes now published by the State Agricultural and State Horticultural Societies, ought not to become a law."

President Stilson said he was glad to see these resolutions adopted with such unanimity. He believed the farmers should study their interests, as a class, more carefully, and then enforce such legislation as would foster, encourage and protect those interests. Farmers could have more influence if they would assert their manhood and independence. The farmers of Wisconsin had made the railways obey the law and had established the principle of state control. Farmers had elected Judge Davis to the United States Senate from Illinois in spite of politicians.

J. M. Smith thought farmers should not be governed by politics and politicians, but should see that able, honest and pure men were elected to public positions, that farmers ought to be firm, stand together and not be controlled by demagagues.

Mr. Plumb said that farmers ought to resolve, and ought to persist in carrying their resolutions into effect; not be manipulated and controlled by those whose interests were not in harmony with theirs.

Mr. Anderson said it was the duty of farmers to look to legislation which would directly benefit them, and he was glad to see this convention instructing legislators in their duty. Farmers ought to work more in harmony as other interests do, and their influence would then be felt.

Senator Campell said Mr. Anderson had struck the key note. Farmers must work together, and stand by their friends, those whose interests and sympathies were in harmony. The agricultural interest was the leading interest in this country, and eventually must be the controlling power in shaping our legislation. Education and concert of action among farmers will effect this result. The great agricultural interests should be represented in the halls of state and nation by educated men of the agricultural classes.

ARE FAIRS HUMBUGS?

BY GEO. J. KELLOGG, JANESVILLE.

“Yes sir; No Sir; five of them,” as the Irish boy said to three questions asked him at once. The result of years of observation bring me to the conclusion that fairs are not doing the good they ought, and are in many cases genuine humbugs. The objects sought by these public exhibitions should be the dissemination of practical knowledge to the masses, verified by the exhibition.

One great difficulty is the selection of judges for the several departments; a horse jockey may do well as a judge on speed, but put him in the hall of Fine Arts and he may be a failure. An enthusiast in Horticulture might not know anything about machinery, while a good judge of threshing machines might not know anything about a churn; and most any one feels qualified about 1 P. M. to act on the bread and honey committee.

After everything has been done by the officers in getting up a premium list, appointing judges, obtaining their consent to act, and everything works splendidly till the superintendents of the several departments look for their men and find but one of them on hand ready for work. A. is sick, B. is out of the state, C. has come to the fair with a fine bull, and D., his neighbor, has a horse, not much to be sure, but if he can recommend C. as a good judge on horses, and get him appointed as one of the judges, and by the same efforts of C., D. is appointed as one of the judges on cattle, how easy it is sometimes for them both to get premiums to which neither of them are entitled. If any one has vanity enough to think he can correct these errors let him try it. How easy it is for men whose integrity is unquestionable, but having a soft spot in the head, to favor a friend in making their awards; especially is this the case when the contest is very close.

Another error, frequently, is of otherwise good judges dividing up the premiums without regard to real merit. No small difficulty arises frequently in the wording of the premium list, for instance: “Best 10 varieties without regard to adaptation;” is the word *best* to apply only to quality or size, or both, and these being equal has adaptation anything to do in the award?

In one class the judges will go for quality, in the other for size; and by a different construction the following year the whole thing may be reversed. Too much care cannot be taken in making the premium list so plain that these errors will not occur. Others often come from too much work for committees, bad arrangement of articles, working while the crowd is great, finding an entry but no list or person able to explain, articles entered in the wrong class, entry cards in the exhibitors' pockets, sweet potatoes and cabbages entered as *pears*, preserved fruits in water, articles purchased or stolen and entered as grown by exhibitor, grain bags half filled with foul seed carrying off first prizes, exhibitors exchanging specimens, even without the knowledge of the owner, in certain cases. Entry by numbers, in some departments, brings ten fold more labor upon committees, and is of no benefit; the admission of tardy exhibitors after the "books are positively closed." These and very many other objections to the usual manner of making awards, tend to confirm in the minds of many that "fairs *are* humbugs."

All these things happen when honest judges strive to make just awards. Add to these objections the errors of inefficient and uninterested judges, and how much more *truly* the cry of "humbug."

Many get premiums they have not earned; many fail to get them who are justly entitled to them; and this will always be the case. But this premium question should not be the great object of our exhibitors. Let us lay aside this matter of dollars, and get up one grand exhibition, on the true merits of the case, and let the honors pay the bill. Especially would this be commendable in the present condition of our treasury. The unfavorable weather during the time of a fair may cause a partial failure to pay premiums, but never should it result in such a total failure as was the case at Oshkosh last year, when the promise was *pro rata*.

It is impossible to get up a programme that will suit everybody, but what are the tendencies when the executive board spend so many hundreds of dollars on horse racing, and so few cents on many important branches of industry? While gambling and beer-guzzling are prominent features of our fairs; while the Sabbath is disregarded, and open fair is held under *any* circumstances; while these things continue, fairs to the better portion of the community are becoming anything but commendable.

Fairs must be so attractive that they will be a financial success;

they must be so conducted that the public will have confidence in their pledges; and with a reasonable amount of common sense in its officers and judges, by avoiding all possible errors, educating the masses to a higher standpoint of morality, giving such trials as shall bring out the improvements in machinery, the greatest yield of grains, the finest fruits, the most improved stock, and that stock so adapted to the wants of the community that when a man is sent for the doctor he will not have to leave his horse and take it on foot in order to gain time, or to so improve the breed of cows that one from the common herd will have to be taken to raise the blooded calf; showing how we may avoid the errors of the past, and to this end a knowledge of our failures may give the key to future success; the best method of improvement of our worn out lands, the adaptation of fruits and grain to certain soils, and I believe by appropriate awards we may aid in relieving our city schools of that red tape and military precision which so hinders our educational interests. Anything that shall tend to increase our prosperity as a people, develop the great resources of our state, improve our lands, beautify our homes, ameliorate our climate and beautify our farms by the planting of evergreen wind-breaks, give scientific research a greater impetus, stimulate inventive genius, bring to light new fruits which shall come nearer perfection than any we now have, increase the home product of those fruits which shall, by their free use, do more to protect us and our little ones from disease than all the pills in our land; the dissemination of that knowledge that will aid us in thwarting our insect enemies; in fact, anything that will hasten the good time coming, when success shall be written upon our own banner, and prosperity attend on our people, then shall fairs be divested of more of the humbug, and prove a greater success.

President Stilson thought some things in the paper just read too true. With all the care possible, sometimes tricky, unscrupulous men would get appointed judges, but the aim of the state society had always been to get honest, capable judges, and those who felt it a duty to serve. Local fairs suffered more than the State Fair from incompetent, weak, selfish men to judge upon exhibits.

In relation to blooded stock he believed in them. Had a good herd of Short Horns, and raised a calf from each cow annually. It

was a mistake to think that this breed of cows were not good milkers. Grades were also excellent milkers, and could be taken from the dairy and converted into beef in a short time.

Mr. Boyce spoke of the excellent milking qualities of the Short Horns; were better than Alderneys. Was hoping Mr. Kellogg would throw more light on humbugs; believed in fairs, as they were great educators of the people. Good judges should be appointed and attend, and act, thus obviating dissatisfaction and often manifest injustice. Some men were continually grumbling because their exhibits were not specially noticed, but if good men were appointed to examine them they would receive the notice or award their merit demanded.

Mr. Webster: Have found quite a difference in Short Horns. Some are not good milkers, and some the best of milkers. Had raised cattle to considerable extent, and believed this breed the best, all valuable qualities for milk and beef being taken into account.

CLOVER, ITS VALUE TO THE FARMER.

BY O. M. RICHARDS, ELMO.

We presume that a great many of the farmers of Wisconsin have a kind of general idea that clover is a good thing; that it makes a pretty fair food when cured; that it is passable for pasture; that by plowing under a crop of clover, you plow under a certain amount of manure of some kind, either good, bad or indifferent, and that if you have a few bushels of seed to sell when it is worth eight or nine dollars per bushel, it is really a good thing. But that any systematic effort has been made by any great number of Wisconsin farmers in its cultivation, so as to enable them to speak with any degree of certainty of its value as a crop, we are very much inclined to doubt. We do not pretend to be able to answer the question of the exact value of clover to the farmer, but from our own experience in its cultivation, we feel fully warranted in making the assertion that if the clover plant was better understood it would be appreciated, so that it would form the basis of our agriculture.

In speaking of the value of clover to the farmer, we have no

learned theories of our own or others to set forth. We think we can better subserve their interest by giving a simple statement of experiments, extending over a period of years. By way of premise, it may be as well to state the reasons that caused us to experiment with clover as a fertilizer.

We are one of Wisconsin's working farmers. One who believes that by a system of cultivation we succeed in taking a certain amount of money out of our farms to put in our pockets. If at the same time we decrease the productiveness of our farms, we not only fail to make money, but are actually the losers. On the other hand, we believe that if land pays \$1 per acre over and above the cost of cultivation, it is worth \$10 per acre, and no more. If it produces \$5, it is worth \$50. If \$10, it is as well worth \$100 per acre as the first was worth \$10.

And again, if you increase the productiveness of say a 200 acre farm, \$1 per acre, at the same cost, you not only add \$200 to your income, but add \$2,000 to your capital, and so on in like proportion. If the production of your land decreases, your income is falling off, and your capital melting away.

Several years ago we became painfully conscious of a gradual decrease in the yield of our crops. To remedy matters, we commenced feeding stock, cattle, sheep and hogs. We not only fed all the grain and coarse feed the farm produced, but we bought a great deal of corn from our neighbors.

After pursuing this policy for a few years, we found it not altogether unsatisfactory. We could not always depend upon buying corn at prices that left a profit in feeding it, and what was worse, with all our feeding, we could not make manure enough to keep our land up to the productive standard that we wanted it. We next turned our attention to clover, and the result has more than equaled our most sanguine expectations.

In the spring of 1869, we sowed 20 acres to clover, sowing it with oats, putting 10 pounds to the acre. After the grain was cut, the clover made a remarkable growth; it headed nicely, and much of the seed matured sufficiently to grow. On the 15th of October following, we commenced to turn the clover under; it took good teams and good plows to go through it. The next spring we planted to corn, and harvested 60 bushels per acre. The next spring, we plowed the ground and sowed oats. This brought the seed plowed

under in 1869 to the surface; the result was that we had the ground nicely set to clover again. The oat crop was as good as we ever handled. The next season we cut two bouncing crops of hay, then plowed the ground in the fall. The two following years, 1873 and 1874, we produced large crops of corn. In 1875, we sowed to oats and again seeded to clover, sowing 10 pounds of seed per acre, raising a heavy crop of oats, and got a good stand of clover. In 1876 we cut a heavy crop of hay the latter part of June; also secured four bushels of seed to the acre, later in the season. We are all satisfied that that 20 acres is all right, and in condition to cut a hay and seed crop from next season.

On the first day of June, 1872, we turned 80 good young hogs, averaging 150 pounds, on 15 acres of that clover that was sown the spring before. On the 15th day of September following, the hogs averaged a fraction over 250 pounds, a gain of 100 pounds each, or 600 pounds for each acre pastured.

On the 25th day of May, 1874, we turned 120 shoats (mostly small pigs) that averaged 100 pounds, on twenty acres of clover sown the spring before. On the 20th day of September they weighed $194\frac{1}{2}$ pounds each, or 567 pounds gain to the acre of clover.

June 1st, 1865, we turned 95 head of shoats, that averaged 126 pounds, on the same 20 acres of clover. On the 1st of October they averaged 230 pounds, a gain of $487\frac{3}{4}$ pounds per acre. We then plowed up the pasture, and it was about as effectually dressed with hog manure as one could desire.

Last spring (1876) we planted to corn, commencing May 4th. It came up quick, and grew from the word "go," and produced the largest crop of corn, for a field crop, we ever grew in Wisconsin; as near as could be estimated, 82 bushels per acre.

In the spring of 1876, turned 120 fair shoats on 20 acres of clover. The value of clover had become so well established with us that we neglected to weigh them, consequently are not able to speak certainly as to definite results; but they would not differ materially from the preceding years.

In 1872, sold our hogs for \$3.50 per 100 pounds, live weight. Having produced 600 pounds per acre, the clover made \$21 per acre. In 1874, sold for \$5.55. Having produced 467 pounds per acre, the clover was worth \$31.68 per acre. In 1875, sold for \$6.60. Having made 478 pounds, the clover was worth \$31.54 per acre.

The hogs were never fed a grain of corn or other grain, from the time they were turned on the clover until taken off and weighed, before feeding for market. Another thing that pleased us was the rapid gain of the hogs when put on feed. They seemed to be just in the right condition to eat heavily, digest properly, and assimilate perfectly.

In 1872 we fed 42 days, and our hogs then weighed 365 pounds having gained a fraction over $2\frac{1}{2}$ pounds per day while eating corn.

In 1874, fed 42 days, the hogs weighing 315 pounds at commencement, gaining nearly three pounds per day.

In 1875, fed 37 days. They weighed 326 pounds at commencement, and gained within a small fraction of three pounds per day.

In regard to plowing under green clover for a fertilizer, we prefer to pasture it off with hogs. Think the benefit to the land is as great or greater, and you will get paid for the clover; besides, would prefer to pasture the same land when possible, two years in succession.

Our experience in this direction has not been so extensive as it has in feeding green. So far it has averaged as follows: An early crop of hay, cut by the 25th of June, worth \$10 per acre; three bushels of seed secured in the fall, at \$7; thrashed straw, \$3. Total, \$34; from which deduct cost of harvesting and threshing, \$7, leaving \$27 net. We do not think the benefit to land nearly so great as when the land is pastured.

In conclusion would say, if you want to clear your land of weeds, sow clover, and sow it thick. If you want to grow big corn crops, grow clover, pasture off with hogs. Plow up the land the last of September or first of October, and the corn crop following will make you feel happy. If you want to make rich farms and make money, and not at the same time worry about railroad freights and railroad laws, grow clover, corn and hogs.

Senator Campbell said he had listened with much pleasure to this paper, written by a citizen of his county. He knew him to be a practical farmer, and that the results stated could be relied upon fully. Mr. Richards' farm was a prairie soil, and he was setting an example of profitable farming worthy of imitation; farming which was not only remunerative at present, but would be of increasing profits in the future, as the soil was being made richer, and hence more productive annually.

Mr. Anderson endorsed the practice of pasturing hogs on clover, but thought it unsafe to pasture two years upon the same field. Would not turn hogs in till the clover is in blossom; had raised clover many years and had found it an excellent fertilizer; believed hogs should run in pasture, not be kept in yards, and was not in favor of fattening pigs.

Mr. Hazen enquired how hogs were best wintered.

Mr. McDonald stated that having lost his corn crop one year, he was puzzled to know how he was to winter his seventy-five shoats. He had plenty of oats and good clover hay. He turned them into a yard where there was a clover stack, and fed them two bushels of oats per day. They eat the stack of clover up and then he gave them another. The waste of hay was less than upon that fed to sheep, and the expense of keeping the hogs through the winter was less than upon corn, clover being \$10 per ton and corn 40 cents per bushel.

Mr. Boyce, Lodi, said he had cultivated clover many years. It was very nutritious grass, 75 pounds being equal to 100 pounds of timothy. Clover should be cut when in blossom, and before the stalk became woody; from the 12th to the 15th of June, in ordinary seasons was about the right time to cut it. It must be cut early, also, if a good seed crop is desired.

Mr. Wood, Baraboo, believed clover was the key to success in farming. Said the reading and discussion of this paper would pay anyone for attending this convention, and the practical experience of the writer would, if carried out by our people, be of incalculable benefit to them and the state. Science and practice harmonize. The farmer is more minute and more accurate; 75 pounds of clover and 25 pounds of straw make food equal to timothy. Albuminoids in considerable quantities make it valuable food for pigs, as mentioned by Mr. McDonald, especially in connection with oats.

Mr. Boyce, of Madison, wanted some one to present a paper on sheep raising, and this brought out quite a long discussion, as to the relative injury to this business inflicted by wolves and dogs, some arguing that the dog was ahead, others the wolf.

Adjourned to 2 P. M.

Afternoon Session.

Convention met, and adjourned to the Senate Chamber, at the request of the members of that body.

BETTER AND HAPPIER HOMES FOR OUR FARMERS.

BY J. M. SMITH, GREEN BAY.

Last fall, while conversing with some friends and visitors at my home, about farming and farmers in general, a young lady from Illinois, who was one of the company, said, in a very determined tone, "I will never marry a farmer." "How is that?" said I. "We think farmers are, or ought to be, at least, as good if not a little better than almost any other class." She replied, "Well, it means a life of slavish toil and hard labor; a life almost excluded from society, and shut up, too, in a home where there are but few things more than the mere necessities of life; there is no chance for a woman to be more than a mere drudge or slave of toil, and I will never marry a farmer." This young lady is a native of Illinois; she has lived there all her life, up to last October. She has taught school among the farmers of those magnificent prairies, and thinks she knows something of how they live. I scarcely know when I have been more impressed by any casual remarks in mixed company, than with those of this young lady, and also her determined manner as she uttered them. I could not but ask myself the question over and again, "Are the farmers' homes so much worse than other people's that they are to be shunned by educated and refined young ladies?" If this is so, surely a reform in this respect is sadly needed.

Shortly after the conversation above alluded to, my wife and I started on a somewhat extended pleasure excursion. We traveled some hundred of miles in Illinois, as well as through many other states. I kept in mind this young lady's remark. I saw many pleasant and comfortable looking homes, many beautiful ones; but I must confess that I saw many that were neither pleasant nor comfortable, that is, if we can judge from outside appearances. I saw

very many that made me wish for pleasanter outward surroundings for our farmers' homes. And why shall we not have them? Why *do* we not have them? I know very well the answer that would come from many a farmer; "Oh, I have not the money nor the time to spend in adorning my house and yard," and in many cases the additional remark would be made, "And besides, I intend to sell out the first chance I get, and move somewhere else."

What constitutes a home? I know that this is a very indefinite question, and would receive an almost indefinite variety of answers, yet some farmers homes are about as follows: A miserable shell of a house, with not a tree nor a bush about it, — nothing to protect it from the burning summer sun, or the wintry blast. It has no pleasant yard or garden about it. No flowers bloom on the place, unless, perchance, they are struggling up with the weeds in the fields and along the fences. Perhaps the fields yield a fair harvest, and perhaps not. If the crops are good, the farmer accepts them as something he is fully entitled to have. If they, or the most of them fail, as they are apt to do, he quietly lays all the blame upon the bad season, which, by the way, is only a very impolite way of accusing Providence of not doing what, in a majority of cases, the man ought to have done himself in order to secure good crops. He is generally ignorant and indolent, and often selfish and self conceited. If you enter his house, it is homeless, cheerless and comfortless. It is the place where he generally eats his meals and sleeps; a place where he spends his leisure hours, provided he has no other place to go. His wife goes her daily round of hard labor, cheerless, dispirited and discouraged. If she had ever looked for a nice and comfortable home in the future, she has long since given it up; and if she has hope or courage left, it is that her children may escape at least some of the hardships that have fallen to her lot. She rarely goes from home, and never upon an extended journey. She sees almost nothing of the world, and knows but little more of it than she sees, as there are neither books nor papers provided for her home, and hence she cannot read if she would. The children grow up with the idea instilled into them from infancy, that the farmer's life is one of ceaseless toil, and that poorly paid, of comfortless homes, of an uneducated and uncultivated manhood, and premature old age. If they have the energy and spirit of true Americans, they are restless and uneasy, dissatisfied and discon-

tented with their home, and finally leave it in search of something better, or at least different from what is to them the ideal of a farmer's life. Is it any wonder they leave it? Is it any wonder the daughters declare their intention never to marry farmers? If my young lady visitor had ever seen such homes, is it any wonder that she declared she would never marry a farmer? And yet it is useless to deny the fact that we have just such homes, or places where homes ought to be, among our farmers. I can find them in my county, I know they exist in many others, and I presume they do in every county in the state. How to reach them, or in what way to go to work to get them to try to improve their condition, is with me an unsolved problem.

Not long since one of my sons had occasion to call at the house of one of this class of farmers. He owned 40 acres of land in the forest; and had cleared and was cultivating seven acres of it. Not a book nor a paper was to be seen about the house. My son asked him why he did not clear up more of his land and cultivate it. "Well," said he, "I was afraid I should get out of wood one of these days, and I thought I would just keep the rest of it for firewood." "Well, why do you not have some books and papers about your house to read?" "Oh, I aint got no time to read, and besides, books and papers aint no count nohow." Such men never attend agricultural fairs or conventions, or read an account of their proceedings, nor take agricultural papers. Generally they are constitutional grumblers at their lot in life, while in fact they are only the victims of their own indolence and ignorant prejudices, as well as their self-conceited vanity; all of which help to lessen the comforts of their home, and degrade their profession in the estimation of the intelligent and educated throughout our whole country. They are perhaps the most difficult class to reach, from the fact that they rarely mingle with the educated and refined men in our profession, and manifest but little desire to improve either homes or themselves. And anything done among this class by those of us who have had better education and better advantages in general, must be somewhat of the nature of what our religious societies term "Home missionary work." Gentlemen, let us not neglect to do this as far as it lies in our power. We may thereby make some homes more happy and cheerful, and possibly lay the foundation for many happy ones in the future.

Let us now turn for a brief space to class of homes of a far different order. The owners of them are generally men of means, some of them men of wealth, all of them men of intelligence, and some of them well educated. They are men who attend conventions and are among our most enterprising farmers. They are nearly or quite all of them men who are in reality gradually improving their farms, and also improving in their financial condition. Many of them are first-rate business men, such men indeed as their section of the country could ill afford to spare. And yet how often are the homes of this class of farmers far from what they ought to be, and in reality might be. The wife, instead of having her cares lessened and her labor lightened by their continued prosperity, actually has them increased. There is a larger dairy to care for; there are more hired men to board; there are larger washings, ironings, bakings, etc., to be done, and perhaps a larger proportion of it to be done by her own hands. Good help in the house and plenty of it, is often difficult to get; and the weary wife worries through the days and weeks, she scarcely knows how. One thing, however, she does know, viz: that when bedtime comes, she is too tired to be company for either her children or her friends. She cannot even be society for her husband, but is only too glad to lay her weary head upon her pillow, and rest herself as best she can for the labors of the following day. The library, if there is one, is small and poorly adapted to her tastes and wants. The papers and magazines are not selected with any particular reference to her tastes; and hence, if she had the time to read, she could take but comparatively little interest in doing so. She seldom rides or journeys with her husband, because her household duties confine her at home. If she has a bed of flowers, it is neglected and finally overrun with weeds, because she cannot find time to attend to it, and the hired men are all too busy to fool away their time about a little insignificant bed of pansies, and other worthless things like them.

Her husband, on the other hand, is almost constantly mingling with other men of business and education. With a quick and active mind, he seizes hold of new ideas, and revolves and elaborates them in his own thoughts, until they are perfectly familiar to him. He is posted in the improved methods of farming, and ready to adopt such of them as are adapted to him in his situation and cir-

cumstances. He is posted in regard to the improved breeds of stock, and selects such as he considers best for him. As the years roll away, he becomes a strong man in general information, and perhaps a very useful one to his whole community. He is constantly growing away from his wife, and none knows it as quickly or feels it as keenly as she does. Years ago, when they stood side by side at the commencement of their life's journey, she was his equal, not only morally but intellectually, and in some things his superior. Now it is the giant and the dwarf. Now the husband looks at his wife and wonders why they are so far apart. He knows that she was once fully his equal. Why is she not so now? Whose fault is it? He has not intended to be unkind or untrue to her. Nay, more, he has always truly loved her, and does so still. But she is not the social and intellectual equal to him that she once was, and she cannot possibly make herself such. She cannot make his home as happy as it might be, and herself his most desirable companion and advisor, for the simple reason that she has not had the educational advantages that have been constantly pouring in upon him in his everyday life; the equivalent of which he should have provided for her in other ways, instead of allowing her to move along in her daily treadmill of household cares and labors. He is almost alone even in his own home. If he has been neglectful in the little matters and comforts that he might, and ought to have seen provided for his home — the thousand things that are really necessary to a happy home, but which I have no time to mention on this occasion — his home becomes not a home in any true sense of the term, but the headquarters of his farm and his business, and his wife the head manager of the house, and in some sense a kind of partner with him in some of his business transactions; though he never consults her, but simply tells her that he has done this or that or the other. Do not think this picture overdrawn.

During my recent journey east, I met an acquaintance upon the cars, and while chatting together, a very prominent farmer was mentioned, one with whom we were both well acquainted. He is in many respects a man of much more than ordinary intelligence and ability. He owns a magnificent farm, and has it well improved and well stocked. He is thoroughly wide awake, and is certainly one of the best farmers of the state in which he resides. I remarked to my friend that I was surprised that such a splendid farmer, and

such a splendid man as I considered him in many respects to be should live just as he did. "Live," he exclaimed, "do you call that living? They live just like their hogs." It is only justice in this case to say that the farmer had an improved breed of hogs, and that they fared well.

During one of the drives that I took while east, I passed the old homestead of a man who died a few years since and left an estate valued at \$250,000, and yet it was one of the most desolate and forsaken looking places that I ever saw. Still it was but little worse than it was many years ago when I used to pass it very often, and see its owner devoting every energy of both body and soul to the one single object of getting money. And he succeeded, as his estate of one-fourth of a million indicates. But as to a happy or comfortable home, he never knew the least thing about it, neither did his family. What is such a life worth? You may say that this is an extreme case, and perhaps it is; but it is not the only one of the kind that I have ever seen. Let us take another case. An old school mate whom I visited is a good farmer. He is much more than that; he is well informed, and in all his business transactions a christian gentleman. He inherited his farm and a large fortune with it. He is liberal and generous in his dealings and in his benevolence, himself and family during the last year having subscribed \$3,500 to a single object. I believe he would thoroughly scorn a mean or dishonest deed of any kind. Neither would I intimate that he does not love his wife and intends to treat her well, for I am sure he does both. Yet, when I went there I found her in the kitchen hard at work, and assisted by an old aunt 76 years of age; and this was their daily routine. I spoke to him about it, and asked him why, with his large fortune he would still persist in such a life of manual labor for himself and all his family, when he might do so much good by employing plenty of hired help, both in the house and upon the farm; and both himself and wife might employ their time to so much better advantage in teaching and training others to labor, and enabling them to care for themselves instead of being a burden upon the community. "Well," he said, "I do not work much and do not intend to in the future; but somehow in the house we do not always succeed in getting good help, and it costs considerable, and so we sometimes do without help in the house." And yet his wealth runs into the hundreds of thousands. When I

arose to leave he had left the room; I bid the family good-bye, and went out and found him in the barn yard milking his cows. "Why," said I, "you told me a few minutes ago that you did not work nor did not intend to in the future." "This is no work," said he, "it is only fooling a little with work." "Very well," said I, "when I get back among my friends at the west, I will tell them what the rich farmers of the east call fooling with work is going into the barn yard and milking a whole dairy of cows without help, and perhaps they can judge from that what you would call hard labor." He laughed heartily, we shook hands and parted.

Now, I claim, that with all my friend's good qualities and good deeds, and they are many, still his home life is to a great extent a failure. This is not so because he is too close to provide for such a one as he should have, but perhaps from mere thoughtlessness and negligence. I rode with him in his carriage behind a splendid span of horses; yet he and his wife rarely go out to ride, they very seldom take a pleasure excursion together. Their home is a comfortable one, but lacks the lawns, the shrubbery, the fruits and the flowers that should adorn such a place. The house lacks the valuable library and the music that should be the means of improvement and recreation to every one within its walls. Both himself and his wife are too busily engaged in their daily rounds of care and manual labor, to devote the time necessary to beautify and adorn their home or to improve their intellects and tastes by adding the many things that should combine to make such a home a miniature Garden of Eden.

But I suppose you are ready to ask, "If happy homes are neither among the rich nor the poor farmers, where shall we find them?" Well, there are some very pleasant and happy ones among each class, though we may well wish they were more plenty. It does not of necessity follow that our farmers must have wealth in order to have better as well as happier homes. No class in society is so favorably situated to have cheerful and pleasant surroundings, and at so low a price as the farmer. He is not crowded for room; a few rods of land either more or less in his front yard or in his garden makes no appreciable difference with him. He knows the forests and the shade trees suitable for his place. He can select and set them with his own hands. We all know that with us there are a few kinds of forest trees that are easily obtained and flourish

well almost everywhere; and that when grown they are among the most beautiful trees upon the American continent. I refer, of course, to the spreading elm, and the maples, both hard and soft. And then the smaller shrubbery is so easy to be obtained, and it adds so much to the beauty as well as the comfort of a home, that I am sometimes surprised that any farmer will content himself with none at all. Even a few bushes of the common lilac and snowball would make a vast improvement; and surely no man in the northwest, who styles himself a farmer, should be unable to make and keep in condition a nice yard of grass about his house. A bed of flowers, be they ever so common and be it ever so small, is an absolute necessity. Perhaps you will not care for it yourself for the first year or two, but after that, you would be almost as unwilling to do without them as any member of your family.

The garden should be a place of beauty as well as of profit; not simply a spot of ground where there are a few early potatoes and corn, and possibly a few other things planted, and after having been hoed once or twice left to struggle as best they can with an enormous growth of weeds. A number of years since, I visited a friend who owned one of the most beautiful as well as one of the best farms of its size that I ever saw. I was telling him about a very large crop of melons that I then had nearly or quite ready for market. He said he did not see why his vines did not grow. There were no weeds among the hills, as he had them all pulled up only a few days since; and yet they did not grow and he should have no melons. I knew that he had a beautiful spot for a garden, and that it was very rich; and I went out with him to see if I could get any information as to the cause of failure. Well, there were his vines, feeble and puny, each hill having a space of ground from two to three feet in diameter, from which the weeds had evidently been pulled up within the last ten days. The balance of the ground was covered with a growth of weeds from four to six feet in height, and as thick as they could grow, and the ground almost as hard as the road. And he wondered why his vines did not grow. His other garden crops were in a similar condition; and yet I scarcely know of any person who enjoyed the products of a good garden better than his family and himself.

Now why is this? Why is it that so many of our farmers fail to have anything that by any stretch of imagination can be called a

good garden, or a pleasant and comfortable yard about their homes? I can account for it only in one way; and that, by supposing they have never tried either one sufficiently to know their real value and comfort. It takes but a little spot of ground, if well cared for, to furnish any ordinary family, not only with a full supply of strawberries during the berry season, but to give a good surplus for canning for winter use. Forty quarts per square rod is not a difficult crop to raise. Then come the raspberries and currants — favorites with almost every one. Before these are fairly gone, come the blackberries. While we are yet treating ourselves to this fruit, comes the grape and completes the list of our small fruits, and also completes the season.

Is there a farmer here, is there one in this state, who owns even twenty acres of fair, tillable land, that cannot have these fruits in abundance? I do not believe there is one. Do not say you have no skill in laying out your grounds, and are not able to employ a landscape gardener. I have no word to say against landscape gardening as a profession, still they are by no means one of the absolute necessities to the average farmer. I never took the first lesson in landscape gardening, still I know enough to drain my land and then lay it out in such a manner as will make it very convenient to work upon, and to get about upon without injuring the growing crops. I know enough to manure highly, and then cultivate in such a manner as to make very large crops grow year after year with but few exceptions. My wife is as ignorant in her department as I am in mine, and yet when friends come and admire the wondrous beauty of her flowers, and pick here and there one of almost marvelous size and brilliancy, I never hear them complain that the beds are not laid out after the most approved pattern, or the latest style. The flowers are there. There is no charge for looking at them. And when we are too tired to work any more, too tired to read, too tired to sing, we can still go out and see the flowers.

Gentlemen, let me urge upon you not only the real necessity but the pleasure of making home more pleasant and attractive. You will notice that I have asked for nothing that is beyond the reach of the common farmer. I have purposely avoided recommending any large outlay of money. A home may be made exceedingly attractive with but a small outlay of money, though it will take some time and labor.

Many years since a young lady schoolmate of mine, a few years older than myself, married a young man and moved to the forests of Michigan. They settled in a dense oak forest, and for years there was no house within miles of them. Here they commenced, as thousands had done before them, and thousands have done since, to hew out a home and a competence. After years of hard labor, a pleasant farm spread itself out before them. Their home was a plain, though comfortable log house. Outside of it grew shrubbery, fruits and flowers. A magnificent prairie rose had covered a portion of the logs from view, and was trying to cover the roof. Inside was a small library of select works. Papers and magazines were always there. There was not a single article of expensive furniture about the house, though there were the thousand and one little things that only the loving wife and mother's hands can so arrange as to make everything seem just as it should be. One day a friend came in. He was the owner of a very large and finely furnished home, one of the best in the county. After chatting a minute or two, he threw himself down upon a lounge in the room and said, "Well, Sarah, there is more pure home in this house than in any place that I was ever inside of in my life." A family of children grew up there; but the sons were in no great hurry to leave their home; the daughters did not promise themselves that they would never marry farmers; and now as old age is creeping on and claiming this happy pair for its own, the loving hands of sons and daughters and grandchildren are clustered about them to shield and protect them from every earthly ill as far as it is within their power. They are not rich; the world will never hear of any great deeds of theirs. But a happy home is theirs; and an intelligent and happy family has grown up about them, and now a happy old age is theirs. Is not such a home, humble though it be, worth having? Is not such a life worth living? A friend was describing a visit that he had made among some friends at a rural home. I may not give the exact words, but they were substantially as follows: "The house was not expensively nor extravagantly furnished. There was a small library and plenty of papers and magazines seemed to be lying about loose everywhere. There was a musical instrument and plenty of music, as the family were nearly all singers. The house was not a large nor an expensive one, yet it was one of the biggest homes that I ever got into in my life."

Gentlemen, there are some, yes, many pleasant and beautiful homes among the farmers. I wish I could honestly say that they were the rule, and the lonely, lonesome, desolate house, standing like a sentinel and seeming to say, "I am comfortless and homeless; come not near me," the rare exception. We of the northwest occupy the best portion of this continent. It may well be doubted whether there is another territory of equal size upon this globe, that combines so many and such favorable advantages for farmers as these northwestern states. And shall we not make our homes as attractive as our country is rich and beautiful? Let us not fail to do our share to the very best of our abilities. If we but make our homes what they might be, what they should be, and what we really can make them, heaven would be much nearer earth, much nearer our homes than it is to-day. The millennial morn will dawn much sooner, and its glories will linger much longer among beautiful and happy homes than it will where families only meet together to eat and sleep and be sheltered from the cold and the storm.

Let us make our homes, humble though they may be, pleasant and attractive. Let us make them cheerful and happy. It can be done without much money, but it will require that husband and wife shall work in harmony, and work together. If we but do this, I have no hesitation in saying that the time will soon come when the complaint would cease to go forth that the sons are all leaving the farms for other business. We should no longer hear educated and refined young ladies declare their intentions never to marry farmers.

Mr. Boyce, Madison, desired Mr. Smith to tell us how to spend the time to make homes so attractive, when so much work must be done to produce the absolute necessities of life.

Mr. Smith. — A little time each day will bring these attractions. The rich can have more attractive enjoyments; but the poor may have cheap but equally enjoyable pleasures. Farmers perform too much physical labor — can accomplish more by less physical and more brain force: thinking, planning and supervising. Believed that every one could find time to tastefully fit up their homes and make their surroundings pleasant and attractive.

Secretary Field agreed in the main with the writer of this excellent paper. He believed the homes of most of the farmers could be

made more pleasant and attractive than they are, and that this inexpensive beautifying has an elevating and beneficial effect upon individuals and communities. He did not believe, however, in adopting any fixed rules for pleasure and enjoyment—our tastes and desires were different, and each was seeking happiness and contentment, and what would contribute this to one would not to another. We should try to cultivate the higher order of enjoyment, lifting up and ennobling mankind, and really making the world better for our having lived in it.

Mr. Smith thought we should not live wholly for ourselves; this was a low order of happiness. Riches, if wisely used, bring comforts and happiness; but the miser's happiness is but little above animal desire.

Mr. Wood said he here desired to express his admiration of the sentiments advanced in the paper just read; they were elevating and ennobling, and if all would cultivate and practice them, they would come nearer fulfilling the high destiny of man.

REMARKABLE TREES AND PLANTS.

MRS. H. M. LEWIS, MADISON.

“It is pleasant to note all plants, from the rush to the spreading cedar,
From the giant king of palms to the lichen that staineth its stem.”

Throughout the whole world, nature has bestowed her gifts most bountifully for the good of man, but to the dwellers of the tropical world she has seemed most kind, for she has given out of her great storehouse a vegetation that supplies mankind with home, clothing, food, shade, and shelter; all these gifts she centers in her wonderful palms. The palms do not send out branches like the trees of our northern forests, but have a straight trunk, terminating in a crown of gigantic feathery leaves of great beauty. Nearly all kinds of palms furnish nourishing food or drink for men. The fresh sap from the tree furnishes a delicious beverage, and, by fermentation, an agreeable wine or brandy; a fine sugar is also produced from the sap. The soft and spongy substance, in the inner part of the

trunk of the tree, produces sago; a single tree producing five or six hundred pounds.

The terminal bud of the cabbage palm, boiled and eaten with coconut oil, is a dish highly prized by the epicure. The ashes from some of the fruits produce salt of inferior quality, and the bread from the bread tree is both sweet and nutritious. The delicate bark of the unopened leaves is twisted and so used for making thread, valuable hammocks, cloth, etc. The leaf, after being submitted to a certain process, makes durable writing paper. A complete enumeration of the uses of the palm would fill a volume; the bread palm alone is said to be put to eight hundred different uses. The number of species already described reaches six hundred, and probably when the tropical world is more fully explored, the list will exceed a thousand.

The Bread Palm is a native of the Pacific islands; it grows from forty to fifty feet high, rising half-way without a leaf. The fibrous bark is made into cloth in the South Sea Islands, and the fruit supplies the natives with the principal part of their food. This fruit is oval, of a rich yellow hue when ripe, and about the size of a child's head. It is gathered for use before it is fully ripe, while the pulp is white and mealy, and is produced two, and, sometimes, three times a year. In preparing it for food the South Sea Islander cuts it in three or four parts, takes out the core, digs a hole in the ground, puts in a layer of heated stones, covers them with green leaves, and upon this he places a layer of the fruit; then again the stones, leaves and fruit alternately, until the pit is nearly filled, when leaves and dirt are spread over all. Baked in this way it will keep fresh for several weeks. Large pits are frequently made and parties join together to "do up the baking," and the occasion is quite a social event.

The Oil Palm is a native of Africa, and grows from sixty to eighty feet high. The stems are thickest in the middle, tapering upwards. The flowers smell sweet, like anise. The fruit forms an immense head, like a giant pineapple, consisting of a great number of orange-colored drupes, having a thin skin, oily pulp, and hard stone. The pulp yields, by bruising and boiling, an oil, which, when fresh, has the delightful odor of violets, and when removed to colder regions, acquires the consistency of butter. When the oil is fresh, it is eaten like butter; the unripe nuts make an excellent

soup. It yields from its trunk a pleasant and harmless drink, which, however, becomes intoxicating in a few hours.

The Palmyra Palm is a native of the East Indies; the stem attains a height of forty or even sixty feet, and is described by travelers to be a remarkably beautiful tree, with its magnificent crown of large fanshaped leaves. The palm leaf fan which we enjoy so much on a hot day, is made from this leaf. The fruit is as large as a quart bowl, having a thick, glossy, dark-brown or black rind, and containing three seeds, each as large as a goose egg. This palm abounds greatly in the north of Ceylon, forming extensive forests. It furnishes a great part of the sugar, wine and arrack (an intoxicating drink) of India. Thousands of the inhabitants of Ceylon depend upon this tree for the supply of all their bodily wants. It is put to as many as seven hundred different uses.

The Date Palm often grows to the height of a hundred feet. This "tree of the desert, which plunges its foot into the water, and its head into the fires of Heaven," is a great blessing to mankind. In the oases of the desert of Sahara, groups of this palm are frequently seen, and what a priceless boon to the weary traveler in this desolate land they must be, for here is found refreshing food, shade, and shelter, that is able to give man and beast new strength, and courage to press onward over the burning sands. This very interesting and beautiful tree seems doubly dear to us, for, in its shade our Saviour found rest and repose, when weary, footsore and discouraged, and it is also from this tree, as Jesus approached Jerusalem, that the multitude of people took branches of palm trees and went forth to meet Him, shouting, "Hosanna, blessed is he that cometh in the name of the Lord;" hence our Palm Sunday.

Mohammedans believe according to the Koran, that Mary, the mother of Jesus, took refuge under this tree, and there gave birth to the Saviour, and by its fruits she was miraculously supplied with food, for in shaking the tree (although it was without fruit, being in winter), ripe dates fell upon her for her refreshment, "to eat, drink and calm her mind."

The Ivory Palm is said to be the most beautiful of all the palm family. It grows abundantly in South America. The stem is short and sometimes so weak that it leans upon neighboring trees for support, but the leaf is magnificent as it rises thirty or forty feet in length, like an immense ostrich plume. The fruit is as large as a

man's head, and consists of several nuts of oblong form, about the size of a hen's egg. The kernels of these nuts are exceedingly hard, and resemble ivory so nearly that it can with difficulty be detected from the genuine article. Many millions of these nuts are brought into the United States and England each year, to be manufactured into ivory ornaments.

OTHER REMARKABLE TREES AND PLANTS. — Cow Tree (*palo de vaca*). A name given to a number of species of trees of different natural orders, the milky juice of which is used instead of milk. It is a native of Africa, and a lofty tree of beauty, with slender stem and dark glossy leaves, nearly a half yard long. For several months in the year not a shower moistens its foliage, and its branches appear dead; but the native pierces its trunk, and a copious stream of sweet, nourishing milk flows from it. At sunrise, when it flows most freely, the natives can be seen flitting to and fro with calabash bowls, and other rude vessels, to secure the milk; what a pretty picture they unconsciously make in the rich morning sunlight? This milk is nutritious, and is much used; but if we were to analyze it, we should not find the milk of the cow, for it is more than one-half wax, and fibrine, with a little sugar, a salt of magnesia and water.

The Candle-Nut Tree is a native of the South Sea Islands. This tree bears a heart-shaped nut about the size of a large walnut. An excellent oil is produced from this for food and lighting purposes. The inhabitants of the Society Islands, after baking the nuts slightly in an oven, and removing the shell, bore holes through the kernels and string them on rushes, then hang them up in their rude houses for torches and other purposes. These torches are much used in fishing by night, and burn with great brilliancy.

The Traveler's Tree (*Ravenala*) is a native of Madagascar, and is a vegetable wonder. When the young tree first appears it bears several leaves, but as the tree grows, the lower leaves drop off, and in an old tree the lowest leaves are thirty or forty feet from the ground. The body of the tree resembles that of the plantain, but sends out leaves only on the opposite sides, like an immense open fan. The tree usually has from twenty to thirty leaves; the stalk of each leaf is six or eight feet long, and the flat parts of the leaf four to six feet more. The fruit is not juicy, but is filled with a fine silk fibre of most brilliant blue, among which are thirty or forty seeds; the

leaves are used for thatching, and for many other purposes, and the leaf stalk for the partitions and outer siding of houses. The leaf stalk contains about a quart of water; this is obtained by piercing the thick part of the base of the leaf with some sharp instrument, and the water obtained is pure, pleasant, and refreshing to the traveler.

The Grass Tree is a native of Australia, and from a distance, resembles the palm. It does not attain to a great height, and is supposed to be many centuries old before it reaches four feet. It has a shrubby stem, with tufts of long, wavy, coarse grass-like foliage at the summit, which is highly relished as food by all kinds of cattle. A long cylindrical spike, covered with hundreds of pinkish-white flowers, shoot out from the center of the tree; the inner leaf, after being roasted, is an agreeable article of food; a resinous juice exudes from the body of the tree, that is much used as a medicine, and when mixed with a certain kind of clay, makes a valuable cement.

The largest flower known is the parasitical *Rafflesia Arnoldi*. A well developed flower measures a yard in diameter, and weighs fifteen pounds. "Seen from a distance, through the dark green leaves of the vines among which it grows, the rich wine tint of the flower, flecked with spots of a lighter shade, is said to impart a warmth and brilliancy of color to the whole surrounding scene." The center of the flower is cup-shape, and usually holds about a quart of water; it produces but one leaf, which is about fourteen feet long. Storks and other large birds walk over it with as much ease as if on dry land. The carrion-like odor of the flower is very disagreeable.

The Ink Plant is peculiar to New Grenada, and the simple juice is used without any other preparation. This vegetable ink is said to be of a reddish color when first used, but becomes perfectly black after a few hours; and it is said to be so indelible that it keeps its color for all time.

The Flint Plant, although living and growing, exhibits no sign of life, as "it has no foliage whatever, but little pellicles of fine flint bud out of the twigs and stems, which latter are likewise encircled with rings of flint at every joint. In some places the flint, which it appears has exuded from the plant itself, cases the stem like a pipe." The bushy plant looks like a dead stick, but upon bending

it, it will be found to be as tough as leather. One of these wonderful plants is in the possession of a gentleman in England, and he has refused large sums of money for it.

A dwarf tree was some time ago discovered in Southern Africa, whose summit never reaches more than two feet above the ground, and the woody stem never bears more than two leaves. These remarkable leaves appear as soon as the plant rises out of the ground, and remain with the plant during its entire life, which is represented to be at least a hundred years. The leaf is green, and about six feet long, and the flower stem shoots up from the stumpy body, between the leaves. "The leaf is flattened at the top, and like a folded card table, is divided by a central line, in two equal parts." In an old plant, the leaves split into shreds before the tree dies. Two of these trees were on exhibition at the Centennial, in Agricultural Hall.

The Resurrection Plant, of California, is both curious and interesting. When in a state of rest, it somewhat resembles, in color and form, a pine cone, with the exception that the Resurrection Plant has fine, fibrous roots. If this dead looking plant be put into a bowl of lukewarm water, the outer leaves will soon begin to unfold, and in a few hours this ugly cone will burst forth into a beautiful bright green plant, a single leaf measuring six or eight inches. If allowed to resume its vigor occasionally, it will keep fresh for years.

An Electrical Plant, a species of *Phytolacca* (Pokeweed), has been discovered in Nicaragua, which corresponds with the electric eel of the animal world. If the hand comes in contact with this plant, a shock of electricity like that from a galvanic battery is felt. A compass is sensibly affected when near the plant, and when placed in the middle of the bush, the needle turns with great rapidity. The intensity of the electricity is said to vary according to the time of day, being slight during the night, and at its height an hour or two after twelve o'clock; during stormy days it is considerably increased. In dry weather the plant remains in a withered state, but with the arrival of rain it returns to its original vigor.

The Insectivorous Plant, *Dionea*, commonly called Venus' Fly-trap, is a very remarkable plant, found in the bogs of South Carolina. It is noted for the irritability of its leaf. The leaf-stalk is large, and bears at the end a good-sized circular leaf, that has at

the margin long, stiff hairs, and having on its upper surface many small glands, or bladders, and three irritable hairs on each side. If the insect touches one of these hairs, or organs of feeling, the two sides of the leaf immediately fold together, the marginal hairs holding it so firm that the prisoner cannot escape. The leaf will not open again until the insect is dead and all motion ceases. Darwin, and other eminent scholars, startle us by asserting that this wonderful plant has the power of absorbing and digesting its prey. If this be true, the all-absorbing question of to-day is: Where does animal life begin? Is it in the plant? The general laws which govern life prevail in plants as in animals. If the plant has power to digest the insects, it must have some sense of feeling; if it has the sense of pleasure, it has also that of pain, as the two are inseparable. Is it feeling that causes the sensitive plant to drop to the ground when touched by the hand? Who will explain the strange phenomenon of sleep in plants, as we see it in the clover field before sunrise, when every leaf is closed? Greek superstition endowed the *atropa mandragora* with all the sensations of an animal, and believed that it shrieked with pain when its roots were wrested from the ground.

A correspondent of the *English Mechanic* gives his experience with music, as a medicine for unhealthy plants. He had a harmonicum removed to the green house, and indulged freely in music for some months. He says: "I was surprised to observe a gradual, yet rapid recovery of health on the part of my plants, and have thought it quite possible to impute it to the influence of music." He further says: "Nature is not complete without music—the songs of birds especially." If his story be true, we can believe according to Hafiz, that "the rose appreciates the tender melodies of her lover, the nightingale." We love to think that in the spicy perfume of the morning breeze, the millions of flowers that grow in valleys, deep dells, and over mountain sides, have some faculty of expression—perhaps is wafted through each other's senses, a language of love, the comprehension of which will to us be a heaven of delight, when we are taken to the beautiful garden above.

HORTICULTURE IN LITERATURE.

MISS ELLA A. GILES, MADISON.

Many writers, if questioned concerning horticulture, would reply: "It is a science of which I am wholly ignorant." And yet we can find no work, in the realm of either fact or fiction, in which it is not directly, or in the employment of brief illustrations, the help-mate and companion of literature. Tender allusions to its lessons occur in the rhetorical address, sublime dissertation, and the dullest essay.

One may never have seen the contents of those ubiquitous pamphlets or volumes entitled horticultural reports, and yet, by means of general literature, have unconsciously acquired much information on this subject. The author and artist, as well as the scientific student and manual laborer, aid us in comprehending its principles. While they do not admit us to the penetralia of economical and successful husbandry, they awaken in us a keen appreciation of its various pursuits. The groves of poetry are full of singers, whose most enchanting strains have been inspired by contemplating nature, as seen in the field and garden. Some of the finest conceptions in romance have sprung from those most familiar with the gentle language of fruit and flowers. Even in novels of the most sensational school and exciting plot, one comes upon half-hidden gems of thought, that would seem to have dropped spontaneously from nature-loving minds.

Numerous and beautiful passages from ancient writers, prove the high estimation in which horticulture was held in the past. The old English author, Walter Harte, says:

"My garden takes up half my daily care,
And my field asks the minutes I can spare."

And the English poet, Matthew Prior, at a yet earlier period wrote:

"How mean the order and perfection sought,
In the best product of the human thought,
Compared to the great harmony that reigns
In what the spirit of the world ordains."

That horticulture occupies an important place in the literature of our own day is evinced by the frequency with which enthusiastic expressions regarding it fall from modern pens. From innumerable illustrations that the gardener may well prize, we select a few lines from Whittier:

“Give fools their gold, and knaves their power;
Let fortune’s bubbles rise and fall:
Who sows a field, or trains a flower,
Or plants a tree, is more than all.”

We receive from gardeners a bequest which we do not always regard with the gratitude it deserves; emanating from tastefully cultivated grounds, there is a subtle yet permeating influence that molds the minds of the masses, though they do not realize its force. While this influence is always beneficial, it is specially valuable in unfolding the poet-soul. Dryden felt this, and wrote:

“When nature cannot work,
Th’ effect of art is void.”

While literature is indebted to the art of horticulture for specific donations of thought-material, horticulture owes much to general literature for an abundance of *suggestions*, awakened by genius not wholly bent upon this theme. The word pictures of nature, in which literature abounds, can but charm the eye and delight the senses. The skill of the artisan has been carried into the heart of forests and out upon the bosom of broad prairies by means of the soul-felt praises of the verse maker, as well as by the actual necessities for remunerative labor. While many features of rustic life are idealized by poets, there are faithful portrayals of its rugged toils and rich rewards. Not only do they manifest the most delicate appreciation, but they also give advice that is as practical as it is poetical. What better theory of fruit culture than that conveyed to us in the verses of William Cullen Bryant?

“Come let us plant the apple-tree,
Cleave the tough greensward with the spade;
Wide let its hollow bed be made;
There gently lay the roots, and there
Sift the dark mould with kindly care,
And press it o’er them tenderly,
As round the sleeping infant’s feet
We softly fold the cradle-sheet;
So plant we the apple-tree.”

Should this counsel, so daintily devised, be heeded by a tiller of the soil, he is warned by Dryden that —

“Much labor is required in trees, to tame
Their wild disorder, and in ranks reclaim.”

And again he learns from the same source, that to be successful, he must,

“With his pruning-hook disjoin
Unbearing branches from their head,
And graft more happy in their stead.”

One can gain from poetry alone, sufficient information to begin the process of gardening. We are told in rhythmical and comprehensive lines —

“Let thy vines in intervals be set;
Indulge their width, and add a roomy space,
That their extremest lines may scarce embrace.”

Another writer lends still further aid by saying —

“When swelling buds their odorous foliage shed,
And gently harden into fruit, the wise
Spare not the little offsprings, if they grow
Redundant.”

All poets seem to deserve the title of botanists, even though claiming to possess no knowledge of natural history. A mist of technical words sometimes prevents an interpretation of Flora's smiles, while her secrets are clearly revealed through the medium of a few simple lines, that yet make no pretense of affording instruction. The exact order in which certain flowers appear is gracefully given by Bryant —

“The wind-flower and the violet, they perished long ago,
And the brier-rose and the orchis died amid the summer glow,
But on the hill the golden-rod, and the aster in the wood,
And the yellow sun-flower by the brook, in Autumn beauty stood,
Till fell the frost from the clear, cold heaven, as falls the plague on men,
And the brightness of their smile was gone from upland, glade and glen.”

The poet has invested all the departments of horticulture with wondrous attractions to the uninitiated, by shedding upon them, in

return for their cherished legacies to him, the halo of his tenderest thought. Books and floral beauties are fit associates. The home that is adorned by both is ever the abode of intelligence and refinement. The horticulturist should assiduously cultivate the love of literature, not only for the advantages which will result to him in the line of his profession, but because of many other benefits, less direct but equally important and lasting. So should those who are engaged in mental pursuits, consider well the lessons of a science which produces pure and innocent delights, and furnishes an inexhaustible fund of apt illustrations.

Horticulture and literature should extend the right hand of fellowship, for the intercourse of the learned in nature and the learned in art, can but result in wide benefits to both.

SUMMER TREATMENT OF WINTER BLOOMING PLANTS.

BY MRS. I. H. WILLIAMS, MADISON.

The long winter will soon be among the things that were, and the season of preparation for summer is at hand. We meet again to tell of the realization of some projects, and the utter defeat of others. All must have gained something by another year's experience; so, like busy bees, we come to the hive bearing our mite. These stars of the earth that have brightened homes and lives, almost beguiling one into the belief of endless summer, are worthy of all the care; soon they will be weary, and like mortals, need rest. "What shall I do with them?" will be heard from many that have not quite fathomed the mysteries of plant-growing, the memory of their beauty and fragrance still fresh in mind. We have loved and tended; they have soothed, and perhaps been silent comforters; old friends are dearest, so let us strive to keep them. The treatment which would be beneficial to one might be sure death to another, and having tried successfully this mode of procedure several summers, can say, do thou likewise. We will begin with the cheery, bright Primrose; they have a way of grow-

ing up out of the earth like an onion, and seem to have but slender hold upon life, swaying back and forth at the slightest touch. Remove from the earth and shake or wash it all off, then with a sharp knife cut the lower part of the large root, provided there are enough of fine fibrous roots near the crown; if not, use a larger size flower-pot and set deeper. Have the earth well pulverized, but not rich, as that would cause luxuriance of foliage and indifferent bloom. Water now thoroughly, but sparingly during the summer, and pinch off all buds that may appear; sink in a cool place in the garden or keep on a shady piazza. This may be done in May, and the plants returned to the house in September.

Cyclamen will need fresh soil and to be cared for similar to the latter. Oxalis must be dried off in April, taken from the earth and kept in a dark, dry place. Carnations that have bloomed all winter might be planted out; first cutting well back. If you have a propagating box, using the clippings for next winter's plants, as one winter is all they are expected to do well. Roses! oh, would that I could say that I fully understand them; that is, how to have them always in bloom; to grow them with a miscellaneous collection of plants, it is difficult to make them blossom freely. Oftentimes I think the mystery is solved, and I too, shall have an endless profusion of those most beautiful creations of nature, but just as it seems within my grasp, *ignis fatuus* like, it evades me; then come a few stray, lovely buds like the song of a sweet siren luring me on not to death, but almost destitution of pocket. It is not a happy feeling, this admitting of defeat, still it is better to strive and lose than never strive at all. If I understood the definition of the word discourage, I might say I was affected with symptoms of it; but in the abridgement of my dictionary, the word was excluded. The following plan will give healthy plants, and for me a few blossoms: Shake off the earth, and wash their roots; spare not the knife on the tops; re-pot in rich fresh soil; keep in a cool, shady place for about ten days, then sink the pots in a bright sunny spot in the garden. This can be done any time in May. Water, whenever dry. The Stevia and Eupatorium have, most likely, grown to be great shrubs; cut them nearly to the ground, and take off a large portion of their roots; keep shaded for a few days, then sink them in the ground, any time after frost. Callas, about June, free them from the earth; wash the roots, removing all

decayed substances, and the young bulbs; re-pot in rich earth; water sufficiently to settle the soil, and only occasionally during the summer; keep in a shady place until early in September, when they may go into winter quarters. Any time after frosty or even chilly nights have left us, Bouvardias can be planted out; cut thoroughly back to produce plenty of branches. During August, they will need water daily or they will wilt.

The Laurestinus, for me, for a long time proved itself very unsatisfactory; but on applying to the knowing ones, I found my plan had been quite the reverse of the right; sink the pot in the garden where the sun will shine upon it the day long, and when Thanksgiving comes, it will be filled with its beautiful pearly white flowers. This is not a tender plant, but is improved by being left out and chilled. The Azalia ranks first for attractiveness and length of blossoming; it is not necessary to replant every season, and only trim sufficient to preserve symmetry; it will do best on a north piazza; they require more water while resting than any other plant; should they by any accident become very dry, dip into a tub of water and soak through, for their roots are such a bunch of knots that it requires some time to reach the inner ones.

Begonias will need cutting back and replanting if grown in pots, but the best results are obtained by planting out, on the north side of the house, where they will have shade and protection from the wind. Poinsettias and Euphorbias are of one family, but are not of that class, human-like, which often thrive and develop best when combatting with uncongenial elements, for truly they need nursing in the lap of luxury. The Poinsetta is unattractive during the summer, with its coarse leaves and awkward growth, but when winter comes, "ugly duckling" like, it is the beauty of the flock. In this locality it is not safe to set them out before June; repot the plants in a size smaller than grown in, putting them back in the larger size when brought in, in the fall; sink the pots in the bright sunshine; do not allow them to become water-logged, or they will yellow their leaves, and if an insufficient quantity is given, their leaves will shrivel. Some seasons it may be necessary to bring them in by the middle of August, for they are very sensitive to the slightest chill; many prefer planting in the ground, for in that way they make so many more branches, but are very difficult to take up successfully, as much so as the Heliotrope. Jessamines, both white and yellow, plant in the ground.

Of all the varieties of foliage plants, the *Gesneria* is the most exquisite; it is a bulb, and must be entirely dried off; leave in the pot where grown; keep dry and from the mice; by the first of August, they plainly speak for themselves; their rest is ended and they are ready to begin their lovely mission again; replant in peaty earth, give but little water until their leaves are well grown; keep shaded from the strong sunlight. Ferns, the poetry of flowers, flowers without blossoms: take them from the fern case and plant in peaty or woods-earth in like position with the *Begonias*; by the last of August, reärrange in the fernery; it is impossible to keep them doing well in the house during the heated term; darkness is necessary in our rooms to exclude heat and flies, under such circumstances plant life must fail. Of the varieties mentioned, the most will be found in any choice collection, and like a family of children cannot all be reared or governed quite alike. Through the interchange of plans and experience, may we all go from this hive, laden with the gathered honey. "Tears even, like the rain drops, have oftentimes fallen to the ground and come up in flowers."

SECOND HARVESTS.

BY MRS. M. B. CULVER, MADISON.

"One harvest from thy fields,
Homeward brought the oxen strong;
A second crop thine acres yield,
Which I gather in a song."

The harvest which the oxen brought home was the spoils rescued from Nature who had first to be subdued. When cut down in one spot, she sprang up in other places and in a hundred different forms equipped for battle. When wild nature's enemy, the farmer, slept, or was absent, her ragged troops rose triumphant and waved defiance from every square foot of soil, and never could man have put to rout these vagabond old generals, ragweed, mullein, burdock and thistle, with their legions of followers, had he not allied himself with nature's nobler species, the honest grains and hardy, humble grasses, who, as the great naturalist says, "are its irresistible valor

and heroic force — though they be maltreated and trampled down, yet will they multiply the more.”

These, with man's own invented weapons, the axe, the pick, the plow, spade, harrow, hoe, rake and roller, were the instruments of warfare. Thwarted in her wilder designs, nature became the gentle, fruitful mother of life-giving corn. She blushed in rosy blossoms, smiled and nodded in the waving grains and grasses, laughed outright in great, golden pumpkins, and shed her heart's blood in her vines.

The first harvest is for our physical growth, and without the first, we could neither produce nor enjoy the second, which is for our mental and spiritual welfare. The first is gathered into barns, granaries, cribs and cellars. The second is garnered in the mind, in books, on canvass, and is carried into the library and parlor — we mean the room where we live apart from drudgery — “Where the laughing light invades” — and not the parlor of the dreary woman whose house is a prison and herself a slave.

The wise and noble farmer seeks as faithfully to cultivate and reap the second harvest as the first, and to bring Eden back to earth, turning the curse of labor into a blessing. His home is the dwelling of refined enjoyment, and his children absorb beauty and grace from their home influences as flowers absorb dew and sunshine, and turn them into fragrance and honey. He knows that it is not the sole office of the farm to supply food and clothing for the nation, but that it is also the training school of young men and women.

In the last census report, the total number of persons engaged in all occupations is given as a little over twelve million, five hundred thousand, and of this number nearly six million are engaged in agriculture.

In the hands of farmers' children, there will be placed, to a great extent, in the future, the destiny of the country. The farmers of a former generation are largely responsible for the present condition of the country, and, in a like degree, are entitled to praise for our great advancement as a nation.

The horses, cattle and other live stock of to-day are greatly superior to those of a hundred years ago; and it would speak ill for their masters if they, too, were not far in advance of their ancestors.

The avaricious and unwise farmer, who gathers no second har-

vest, looks upon his home as a spot where he can eat, sleep and rule with an iron hand. Surly and sour, he growls if the house be not swept and garnished, and yet brooms must never wear out nor his wife be weary in well doing. He complains if the table is not supplied to his liking, but gnashes his teeth over the grocer's bill, and his wife asks for the necessary tea, coffee and sugar, with the air of a criminal. He is cross if she does not present as attractive an appearance as his neighbor's happy wife, but neglects to supply her with the tonic of loving praise or appreciation.

She has no library, no pictures or flowers, no papers—nothing but continuous labor. Her husband knows that his crops will not grow unless they have rain and sunshine, but he seldom brightens his own household with the warmth of a smile. He thwarts and nips in the bud every blossoming inspiration of his wife and daughters, until their stunted, unambitious lives are sad monuments of his selfish tyranny. Such a man is meaner than the pigweeds that grow in his fields, "meaner than pusley," as old-fashioned people say. While his motto is "economy," he is worse than wasteful, neglecting and losing his best harvest.

The narrow-minded farmers are, however, the exceptions. Their numbers decrease as churches, schools, newspapers and libraries increase. Conventions are the bane of the narrow-minded man; culture kills him as cultivation destroys weeds. The prudent and truly wise farmer makes the most of the world. By rearing cultivated children he stores away wealth in its best form, and in his old age leaves the world indebted to him. From personal knowledge, I can say that there is no place more enjoyable than a happy farmhouse, and no father's memory can be more tenderly revered than is his who studied to make the home lives of his daughters happy.

Who can repay the father and mother of George Washington for the priceless legacy they left us in an honest son. Poets and artists gather their harvests everywhere, from the flowers, the songs of birds, and the clouds above the wheat fields. The grain and vegetables gathered by the hands of Robert Burns were of little value, but his second harvest of immortal song is priceless! Thomas Moran gathered a rich harvest which will feed art lovers for ages, when he painted our Madison lakes. Especially may this be said of "Sunset on Mendota." Mr. Moran must have been a faithful student of nature, and have painted many studies of sunsets, and

then taken the best of each for this grand picture. The size (I should judge) is the same as that of Farmer's world-famous "Slave Ship." The colors are the same, and it is made up of sky and water, but here all is subdued, the winds are hushed, and waters at rest; there is not even a breath of care or pain. The sun shines through the centre of the picture, as it does in the Slave Ship, and although we were at once reminded of it, how entirely different it is in every particular. The Slave Ship is a terrible combination of horrors. It is not a gloomy, dark picture, as one might suppose, but full of fierce, dazzling light and blinding colors.

The storm is past, but the sea is still in a wild tumult, and the clouds torn and writhing. The forewater is full of ghastly bodies of slaves who were thrown over during the storm; their manacled limbs protruding from the waves, and dim bodies showing from beneath, as they are tossed and whirled about in the mad commotion. The fish, with horrible, gaping mouths, are darting and leaping from the water in ravenous haste to feast upon them, their iridescent sides flashing blue, white and pink in the sun. It is a picture to smite in upon the brain, and once seen can never be forgotten; you feel as if it must have been painted by a man of insane fancy, but yet what "method in his madness!"

In direct contrast is Moran's Sunset. Instead of the floating horrors, we have a gay boatful of young men and maidens, with music and banners. He has, too, so kindly chosen his point of observation as to shut out a view of the Asylum, that refuge of the broken-hearted. He does not even leave us standing upon the high bank, but takes us down on to the opalescent bosom of Mendota into the heart of its splendor, where we float between two skies. How limpid and liquid is the water! The gulls hovering over the bay add to the solitude, and the distant sails carry the eye out into the pathway of the sun and among the reflections. What a wealth of color, and how exquisitely delicate are the subtle forms and tints that lie upon the translucent waters! From them the eye leaps to the dreamlike cloud-mountains and towers, up a shining pathway, where delicate vapors in endless variety show the touch of a master hand. Nature never makes two clouds alike, nor has Moran. His sky is full of infinity. Infinity must be various and vague, and the forms of these clouds are too mysterious to describe. With what loving reverence the artist must have gone to nature to be thus richly rewarded.

The clouds were there while the farmer labored in his field unheeding. He might have seen them as the artist did, but hundreds of times the golden mountains have shone in splendor and passed away without leaving a ray of brightness in his mind. He leads a starved life who is deaf to the songs of birds and blind to the beauties of this world. Cultivate a love of nature and see how richly she will repay your love.

“For nature ever faithful is
To such as trust her faithfulness.
When the forest shall mislead me,
When night and morning lie,
When sea or land refuse to feed me,
'Twill be time enough to die;
Then will yet my mother yield
A pillow in her greenest field,
Nor the June flowers scorn to cover
The clay of their departed lover.”

INEXPENSIVE METHODS OF MAKING HOME PLEASANT.

MRS. D. C. AYERS, GREEN BAY.

Of all the words in the English language, there is not one so vividly expressive, so full of holy meaning as home. It holds in its grasp possibilities, and probabilities which are of wonderful power. It is the keynote of health, prosperity, and peace. It is the home of childhood which forms the character of man and womanhood. Of all the sayings of the Divine Jesus suffering in humanity, none touches our hearts as his plaintive words, “The son of man hath not where to lay his head.”

Homeless! No sadder record meets the eye; yet so far as the mind is concerned, many a household, well fed, clothed and warmed, is homeless. To satisfy the mere wants of our animal nature is not enough. The cravings of a mind alert for finer elements of our being will not be content. We must rise to a nobler work; that of bringing to our homes, even though poor they may be, a degree of refinement now supposed to belong only to the rich. There

should be no home deficient in books, flowers, pictures, games, and useful occupation; no matter how little money there may be, with which to place them there; this is what we wish, as concisely as possible, to speak of.

It is easy for the rich, who, with plenty of money to procure them, may obtain all that taste fancies, or fashion dictates; but how to acquire them without money, how educate our children to cultivate a taste, and love for the beautiful, and satisfy that love, without spending money which their daily needs of food, fuel and clothing require is an oft repeated query. First, let us have books, good ones, books which will inform the mind, and improve the heart without being stupid. But you say they call for money, and that is true. Yet suppose the family to agree that by a little self-denial, one pound of butter less should be used during the week; that, at twenty-five cents a pound, would save thirteen dollars a year, for which sum a good weekly newspaper might be had — which would keep the family well informed on all matters of interest, both in their own and foreign countries; *Scribner's* or *Harper's* monthly for the older members of the family; *St. Nicholas* for the boys and girls, the *Nursery* for the wee little ones, and one good book of travels, or standard work as the beginning of a library, may all be obtained. If some neighbor will adopt the same plan, and take other papers and magazines, exchanging for a time, as much useful reading may thus be enjoyed as most families desire. Especially we would urge on parents the necessity of providing their children good reading. They would not put a grain of arsenic a day in their food, why should they allow poison to enter their minds? Why should the purity of their souls be sullied by books and papers which only interest by the cunning mixture of good with evil, while gratifying the love for the marvelous, educating the mind to all kinds of depravity?

With books thus provided for, let us turn our attention to flowers, as a means of making home pleasant. Why should a family with little money, and many needs for it, be without flowers? Why should their table lack the delicate spring vegetables, the small fruits and large, which others enjoy? Why should the daughters in the home disregard what adds beauty, grace and comfort to the homes of the rich? They are generally the ones whose tastes are consulted, whose wishes are the basis of family action. If the

father and the mother see that a thoroughly clean house, carefully attended cattle, and well cultivated fields are theirs, let the daughters take the surroundings of the house in charge, and rebel at unpainted fences, and unhinged gates, with tools, utensils, and wood piles just where they should not be. Let them call the little brothers and sisters to their aid, find a place for everything, and see that it is kept in its place. Let them claim a piece of ground as their own special property, and have it well dug. To lay out the beds, and plant the seeds is no harder work than to play a game of croquet, or do a piece of fancy work. Lettuce, spinach, radishes, cresses, all may be planted early, and add a relish to the plainest food. Buy the seed, and sell enough of the vegetables to pay for them. If you have but little room, plant flower seeds in boxes. They can be growing until you can place them in the garden. A good way is to make little cones of brown paper, set them in boxes filled with earth — fill the cones with a little sandier soil, drop three seeds into each, when they have well started leave the strongest one, setting out the others elsewhere. When you wish to transplant, take up the cone carefully, and the roots will not be disturbed.

If four friends purchase together, twenty kinds of seeds can be procured for one dollar, and divided, giving a large supply to each one. We would recommend to beginners to select Candytuft, Petunia, Phlox-Drummondii, Mignonette, Pinks, Pansies and Asters, as giving the best satisfaction at trifling expense; these will bloom early and until frost, well repaying the time, interest and patience expended on them. If you have old kegs, pails and pans, set them around the ground in front of the house, cover them with bark from the wood pile, old grape vines and moss, fill them with earth. You need not buy plants; from God's nursery in the woods, you may obtain them "without money, and without price." I sometimes think He put the most lovely there, that those who cultivate the taste for the beautiful, which He has placed in their hearts, need be at no loss for its gratification. There too you may find vines; bitter sweet, woodbines, perennial peas, and many a one unnamed save in Indian lore. Gather them in with ferns and grasses, and you will have what many in the cities pay large prices for, and their beauty must make your home pleasant. Give some of them a place inside also, and let the sun shine on a green spot in your sitting

room. Give the little ones a garden; a spade with which to dig, made of wood if need be, and a few seeds, which they will dig up every day, and enjoy more than many a sickly city child does its store of fine playthings. Are your fences unpainted? Whitewash them, then cover them with vines. Morning glories will make the plainest porch beautiful. Does the sun shine in your window? Make a curtain of nature's own, and let the green shade be yours. Surely these gifts from the Almighty are given to all.

Pictures should find a place in the living room of the family, if in no other. There are many ways of obtaining them in these days, when almost every branch of industry offers a chromo as a prize. Frequently an old magazine will have a fine engraving in it, which can be framed by the ingenious boy, or girl, of the family; sometimes one child has a taste for drawing, a longing to be an artist; encourage him to copy some good engraving; if you do not admire the effort, do not say so, but let it hang a little while on your wall; if he has an artist's eye, he will soon discover its deficiencies. If it has no merit as a drawing, it will have that of making him love his home, and the sympathy of those in it, and while he is doing that he will do nothing worse.

Healthy games, both indoors and out, will make homes very pleasant. Better for the father to play ball with his boys, and know where they are. Wiser for the mother to join them all in a game of croquet, and let them feel that she has a share in their pleasures. Boys and girls who may enjoy these things at home, and have their friends with them there, escape much of the danger of childhood's hours, both bodily and mentally. If you have no croquet set and want one, set the boys at work; it only requires a little ingenuity, and they can do it. If you have no games for long winter evenings, when books are laid aside and all the family can join in some amusement, borrow one and copy it. The drawing and writing it will be an amusement of itself. Any boy can make a checker board, mother can find buttons of two colors, and you can have a checker board, and not pay for it either. If possible let music be one of the sources of interest in your home. If you have no instrument to play on, sing without one. Do not be afraid of a little noise. If the boys shout a little, it is better inside than out. There is some music in every household, and here let me say that no memory of your home, when it has passed away, will be so dear to your children as the

"Sunday evening *sing*," when as a family the voice of praise and thanksgiving is heard. We would that the Sabbath evening might be sacred to the family circle. That there the cheerful, happy group, father and mother, brothers and sisters, might together keep holy day, speaking loving words of wisdom, and singing the glad songs of Zion. Surely those fifty-two evenings of every year would prove so many bars against the temptations of life, the dangers which will beset your children on going out into the world. After books and flowers, pictures, games and music have made your home a pleasant one, give to each member of the circle some duty peculiarly his or hers. Do not bring up your children to the selfish thought that all must be done for them. Give them the satisfaction of knowing that they are needed for the help, each of the other; that there is a missing link when they are not there, to take their own part, not only for the family, but themselves. Occupy them for their own good, and the good of others. So do we believe that mingling duty and enjoyment in their lives, they will look back to the home of their childhood, as a truly pleasant one.

Secretary Field moved a vote of thanks to the ladies who contributed these papers, which he characterized as "so full of beautiful thoughts," and the motion was carried with much enthusiasm.

Mr. Kellogg moved that the ladies be constituted honorary members of the State Horticultural Society, which was unanimously carried.

Secretary Field said he had observed during the reading of the papers that many in the back part of the room could not hear, and kept telegraphing to him to ask the ladies to speak louder. This furnished him an excellent text to urge the more extensive publication of these papers, and their wider dissemination through the volumes of the Transactions. Neither the number of volumes nor of pages should be cut down, as was threatened by some members of the legislature; the people said "louder."

Mr. Finlayson said these papers alone were worth \$5 to anybody, and he looked to the senate to see that our proceedings were not cut down.

Mr. Plumb hoped the ladies would continue to study the nature, habits and characteristics of plants. We should not be taken up too much with fruits. The foliage plants furnished an artistic study.

They should be grouped in masses with reference to their variegated colors.

Adjourned to 7½ P. M.

Evening Session.

AGRICULTURE IN THE MIDDLE AGES.

BY WILLIAM F. ALLEN, A. M.,

Professor of Latin and History, University of Wisconsin.

When I first received an invitation to read a paper at this meeting, I hesitated, not seeing what I could say that would be of interest or profit to you. I was, to be sure, brought up in a farming community, and learned all the routine of farm operations in my youth by such constant practice as a boy in a New England country town is pretty sure to get. Neither have I ever lost my fondness for out-of-door employments, and never feel more contented than when I am at work among my vines and flower-beds. Nevertheless I did not feel that I had any experience—and I certainly had no scientific knowledge—that would qualify me to instruct or even to give suggestions upon any point of husbandry to persons whose business this is.

It occurred to me, however, that my studies had led me incidentally to take some note of the history of agriculture, both in ancient and modern times, and that perhaps I could find something in this field which, if not directly instructive, yet might at any rate possess some interest, in the way of showing the contrast between present and former modes of cultivation. I am far from feeling competent to relate the history of agriculture; an imperfect sketch of its condition in England, five hundred years ago, is all that I shall attempt.

It should be observed in general, that when we speak of the progress of agriculture during the five hundred years that have elapsed since the period which I am about to describe, the progress must be understood to consist rather in improved methods and a greater variety of crops, than in care and thoroughness of cultivation. The English estates in the fourteenth century were devoted to the pro-

duction of a very few crops, of a quality no doubt far inferior to those of the present day, with clumsy and inefficient tools, by unskillful processes, and with no basis of scientific knowledge; but, assuming all these deficiencies in matters of detail, the cultivation was as a whole careful and systematic. They made the most of what knowledge and facilities they had. It would probably be safe to say that at the present day, with all the unquestioned advance in processes and materials, there is more superficial and slipshod farming than there was five hundred years ago. Our opportunities are greater, and we get better results on the average; but our better results are perhaps due to our superior opportunities, more than to the use we make of them.

I have said that the progress of agriculture in modern times has consisted mainly in improved processes and greater variety of crops. The first point of inquiry is therefore, what crops were cultivated, and for what object. Agricultural operations are designed either to supply the immediate wants of men, in the production of food; or to provide materials for manufactures; or, again, either of these classes of products may be exported to foreign countries in exchange for other commodities. The Wisconsin farmer produces wheat for immediate consumption; wool for manufacturing into cloth; and both wheat and wool for export. Now with these last two objects the medieval farmer had little to do; neither manufactures nor commerce existed on a very large scale. Every country was in the main self-supporting; that is, provided by its own production for its own wants. And what is true of the country is also true in a degree of every estate. The estates or manors were large, embracing generally an entire township; and each estate produced corn and meat for its own needs, brewed its own beer from its own barley, and wore garments made by its own women from the fleeces of its own sheep, purchasing whatever foreign articles it required for its surplus.

Small communities like these, which had this habit of depending almost exclusively upon their own productions, with no large and constant channels of exchange, and no facilities for quickly meeting sudden and unexpected demands, were liable to great fluctuations in the value of their products, and to real suffering from deficient crops. Famines were frequent in those days, just as they are now in the remote parts of the East. In the five years from 1316

to 1320, wheat ranged from $4\frac{1}{2}$ to 16 shillings a quarter (of eight bushels).

Manufactures, as a distinct branch of industry, hardly existed at this time, except in some parts of the Continent. And for the purpose of home manufacture, the products required were few and simple. I have said that the estates were large, containing in general a whole township; but this estate, or manor, contained a multitude of agricultural tenants of various grades, and a village, with its laborers and artisans, sufficient for all the simple requirements of village life. The carpenter and wheelwright were supplied with timber from the woods of the manor; the herds of cattle furnished leather, the flocks of sheep furnished wool; iron alone had to be purchased from outside. And there was scarcely any other material for manufacture needed; wool was the almost exclusive wearing material, although for other purposes, coarse cloths were made of hemp, and linen was always more or less in use, although not very generally until the fourteenth century. There was likewise some production of dye-stuffs.

Neither did commerce make any large demands upon medieval agriculture. There was but one commodity of English production which was exported to any extent, and that was wool. England was at this period the great wool-producing country of northern Europe, its moist and equable climate peculiarly adapting it to grazing. This was exported chiefly to Flanders, which was the principal seat of manufacturing industry; but in the course of the fourteenth century, numbers of Flemings — driven away by the disorders and misgovernment of their native land, and perhaps partly by the inundations upon their coast, and attracted by the prosperity and freedom of England — settled in the eastern counties, and established woollen manufactories there — the commencement of the manufacturing industry which has raised England to its present wealth and power.

Wool, therefore, was the one great staple of England, whether for manufacture or for export; for home-consumption too, so far as clothing is concerned. The raising of sheep, which had always been an important branch of industry, assumed large dimensions toward the close of the Middle Ages, and even encroached greatly upon operations which were more strictly agricultural in their nature. Neat cattle were also produced, and, for purposes of food, large

quantities of swine — always the principal animal food in rural communities. The great oak and beach forests of England afforded sustenance for great herds of these. Their capabilities were carefully examined and recorded, and in every manor the woods are given as of fifty or a hundred or five hundred swine. The cattle of all kinds were small; the average weight of oxen purchased for the royal navy, in 1547, was 430 pounds; and this is no doubt about the average of the earlier centuries. The weight of a fleece of wool was rarely over ten pounds. The dairy was also an important branch of industry, both for cheese and butter. It is a curious fact that butter, usually sold by the gallon, was considerably cheaper than lard and other animal fats, so much so, as to be used for greasing wheels and similar purposes. The cause of this relative cheapness must have been that the cattle were so small and ill-kept that they could not supply sufficient fat even for the needs of the farm.

The common beverages were cider — proving a considerable degree of attention paid to the orchard — and beer, which, as hops were not cultivated until a later period, must have been thin and quickly soured. One is surprised to find, not only in England, but in various parts of the continent in nearly the same latitude, frequent mention made of vineyards, and the production of wine in districts where now grapes will hardly grow. This appears to have been the result of a desperate effort to overcome the obstacles of nature, and make English soil yield French products; for there is no evidence that the seasons have become more severe since that time. I find it mentioned, for example, that in the winter of 1363-4, the most intense cold continued from December 7 to March 19; and even in the south of France wine is said to have frozen upon the table before it could be drunk — a statement which I for one will never believe. No doubt the “vineyards” in England at this period grew in great part out of the difficulty of transportation, and the meagerness of international trade, being merely designed to furnish wine for the necessary services of the church. It must be observed, however, that the price of the native wine does not indicate a quality so very inferior to the imported.

Before the introduction of cane sugar, honey was an important and valuable product. It was not only the only sweetening material used in antiquity and the Middle Ages, but out of it was made a

favorite drink, mead. Bee-tending was, therefore, a considerable branch of rural economy, and not only for the honey, but also for the wax. Candles were almost exclusively employed for artificial light; and while the poorer classes made use of tallow the richer classes had nothing but wax—sperm came in with the whale fisheries of modern times, and stearine and similar materials are purely the outgrowth of modern manufactures. Moreover, as in the case of wine, wax candles were essential for the services of the church—another reason for the great attention given to bees.

None of the branches of industry which I have mentioned—neither cattle nor bees, nor the dairy—come very directly into the field of agriculture in the strict sense of the word; that is, the tilling of the soil. When we turn to this, bearing in mind that we have under consideration a commodity which produces neither for manufacture nor commerce, but simply to supply its own wants, we are still struck by the meagreness of the objects of cultivation. It was the cereals and scarcely anything else; no maize or buckwheat, no roots, clover or artificial grasses (these came in in the seventeenth century), scarcely any fruits but apples and pears, although I find plums and cherries also mentioned.

First, a few words upon the crops produced for the food of animals. The cattle grazed for the most part upon the natural pastures and the stubble, and this pasturage was, like everything else in medieval husbandry, managed and superintended with great care and precision. The number of animals which each person was entitled to keep upon the common pasture and the stubble was regulated generally in accordance with his share in the arable land; tenure of arable land carried with it, as a general thing, a specific and definite right of common. A common rule was to allow each person to pasture as many animals as he had means to keep over winter. The preservation of the common for pasturage was an important matter, and I find it distinctly provided, in a document defining the rights of common, that no tree shall be planted upon the land, unless to take the place of one which should perish by decay. After the crops were harvested, the fences were removed and the stubble thrown open to pasture. In regard to this, I find a by-law laid down in one manor, for which I cannot understand the reason, that from Ascension Day (May 5th) to Christmas, no mares with

foals or cows with calves should feed upon these stubbles, under the penalty of a fine.

In the mild winters of Europe, especially in Southern England, the pasturage is hardly suspended altogether any part of the winter; nevertheless, there must be more or less stall-feeding at this season, even here, and the hay crop was an important one. As I have already said, there was no clover or artificial grass; all the more valuable were the natural meadows which, in the descriptions of estates, are always specified with great exactness, and the services in harvesting which are carefully enumerated. Just so it was in the early settlement of New England; the broad meadows, with their coarse wild grass, furnished the only supply of winter food for cattle, and were an essential part of every farm. Besides this, peas, beans and vetches were largely cultivated in the middle ages for the food of cattle and horses.

Let us pass now to the principal crop, the cereals; that which formed almost the sole object of the purely agricultural operations. No doubt the implements were rude and clumsy, and the processes unscientific; nevertheless these were not at the lowest stage. The English plough, in the middle ages, to judge from contemporary pictures, was a heavy, two-handled article, often with a very large wheel, or pair of wheels, to help support and guide it. The manuring of the land was probably not very thorough or systematic, although both marl and dung are mentioned, and directions are given that the manure be covered, so that its qualities be not washed away in the rain. It was common to manure land by penning the sheep upon it; and it was a usual prerogative of feudal lords to require their serfs to keep their sheep in folds upon the lord's land, (the so-called *jus foldæ*). As to the use of dung and marl, I find in a writer of the day, some elaborate and mysterious rules, which I find it very hard to comprehend, and those which I can understand I am informed are mostly nonsense.

There was a regular system of fallows, and in connection with it a rude rotation of crops, but not, it may be supposed, in any sense a scientific rotation, designed to recuperate the powers of the land by the qualities of different crops. It was only that certain of the cereals were best sown in the fall, and others in the spring; and it was more convenient to sow the spring corn in the field used the previous year for the winter crop, than to continue each crop upon

the same land. There were various systems of rotation in use, but far the most common was that known as the "Three Field System," in which the arable lands were divided into three large fields, for the purpose of a triennial rotation. In the so-called "tenement lands," which were occupied and cultivated by the peasants for themselves, but as tenants of the lord of the manor, each peasant had a strip in each of these fields—a long, narrow strip, such as are seen everywhere on the continent of Europe, and in this country in the French settlements along the St. Lawrence. Each peasant had his strip by himself, separated from that of his neighbor by a narrow baulk of turf; but he must cultivate it as the rest did—in the Winter field he must put in winter corn, in the Lent field summer corn, and the fallow field must lie Fallow like that of his neighbors. For, as I have said, after the crop was gathered, the fences were removed and the cattle admitted into the fields to feed upon the stubble and the baulks of turf; of course no one person could be allowed to interfere with the fencing and the pasturage of the community. Fences were therefore, at this time, for the most part, temporary rail fences, put up when the crop was planted, and removed when it was harvested, as is the case in parts of the south. The hedge-rows, which are so characteristic a feature of England at the present day, did not come into general use until towards the close of the middle age. I find, however, in the fourteenth century, directions given in regard to hedges, that they should be of willow or white thorn—showing that they were not uncommon as early as this.

We have, therefore, as a general rule, a triennial rotation of crops, consisting, for the first year, of winter grain (wheat or rye), the next year of summer grain (oats or barley), while the third year the land lay fallow.

It must be understood that the year began at Michaelmas (Sept. 29), which appears to have been the regular term for all agricultural operations, as it still is, I believe, in England. The year began at once, then, with putting in the seed for the winter crop; for this the ground had been prepared by a year of fallow, and by a three-fold plowing. The first plowing, called the "plowing of the fallow" (*warectatio*), was regularly in April "when the ground is broken" (*cum terra fregerit*), meaning, I suppose, when it is dry enough to crumble and not clog the plow. Then after midsummer came the

“stirring” (*rebinatio*), as it is called, “when the seeds have sprung up after the fallow plowing,” (*cum terra pullulaverit post warectum*.) This, it is said, should not be too deep — only enough to destroy the weeds. In the autumn manure is spread upon the land, and it is plowed a third time for the crop — this time two fingers’-breadths deeper, with broad and close furrows. Without being acquainted with the laws of chemistry, these men knew by experience that the ground, when lying fallow and open, absorbed valuable ingredients from the rain and the air.

After the winter crop was harvested, the land was thrown open for grazing, until the next crop was to be put in. This stubble pasture amounted to more than might seem, for to say nothing of the green baulks of turf, which in one estate were estimated to amount to eighty acres, it was the custom, in reaping the grain, only to clip off the ears, leaving the straw standing; then they cut whatever straw was needed for thatching and other purposes, and the cattle were turned into the field to feed upon the remainder. The next spring the summer crop was sown, and again, after this was harvested, the cattle were allowed to pasture upon the stubble until the following spring, when the plowing of the fallow commenced the preparation of the ground for the winter crop.

The plowing was usually done with oxen, commonly eight to a team. Horses were used, but their labor was more expensive; moreover, with the imperfect drainage of the time, the labor of horses was not considered so well suited to heavy, muddy land. A writer of the fourteenth century* recommends using a pair of horses with a team of oxen, as being quite as efficient except in rocky land, and a good deal more economical.

The yield was small. This same writer speaks of a threefold yield, as something unusual, but as certainly not remunerative. Allowing to the acre two bushels of seed, at 12d., and reckoning the three plowings at 18d., the harrowing at 1d., weeding at 1qr., reaping at 5d., and teaming at 1d., a yield of six bushels, he says, will be a dead loss of 3qr., unless some profit can be made out of the straw. This statement is corroborated by the statistics collected by Prof. Rogers, in his *History of Agriculture and Prices*.† For seed, two bushels of wheat and rye go to the acre; four of barley and oats; and the yield ranged from twice to eight times the seed,

*Fleta, Book II, 73, 2.

† Vol I, p. 50.

that is from four to sixteen bushels of wheat; the other crops at about the same proportion.

I have spoken chiefly of agriculture in England, that being the country in regard to which we have the best information. It would appear that in France and Germany agricultural science was somewhat less advanced; in the south of Europe it was in a much higher condition, as might be expected from the greater advancement of these nations in the other departments of civilization. We find in Italy during the Middle Ages agricultural improvements which in the more northern countries belong only to modern times.

The great obstacles to agricultural progress were two: The simplicity of medieval life, which was satisfied with a few gross products, and the artificial restrictions of society which hampered all individuality and enterprise.

The first of these obstacles was removed by the rapid growth of the cities in population, wealth and power, a growth which belongs mainly to the fourteenth century. The rich burghers — plebeians as they were — were not satisfied with the coarse, unvaried fare of a baron's table, nor with the homespun garments of wool and hemp. Commerce began to supply them abundantly with the wines, silks and spices of the South and East, and home productions must likewise be more delicate and varied. The extravagance and luxury which characterized the closing years of the Middle Ages, had at least this good result, that they gave a powerful stimulus to every branch of production. From this new city life begins the first decisive progress in agriculture.

The second obstacle was also removed, but more slowly. With the breaking up of feudalism, serfdom — its natural companion — must perish too; but the process was a slow one, and in many parts of Europe serfdom, instead of being mitigated with the new life of modern times, was made more harsh and burdensome. Still slower to disappear was the control over modes of cultivation exercised by the communities, with their constrained cultivation in common. In some parts of western Europe these usages have not even yet disappeared; in eastern Europe they are in full operation to this day.

I have shown, I think, that, with all its short-comings, medieval agriculture was not at so very low a stage. Unscientific as it was, it was nevertheless careful and faithful; no one can look over the

registers and rent rolls of the English manors of the thirteenth and fourteenth centuries, without being convinced that their proprietors were not altogether the harsh tyrants, nor the serfs the abject wretches which we are wont to imagine. Different countries differed much from one another, and nowhere were the poor safe from violence and insolence; for some countries and some periods the blackest colors are none too dark to describe the abuses of feudalism. But England — with the rarest exceptions — was at all times a land of law; the serf was a freeman towards all but his lord, and even towards his lord he had legal rights which he could enforce in the courts.

In truth, the peasantry of Europe, at least of France and England, appears to have been, on the whole, better off at the close of the thirteenth century than for many generations after. The grossness and violence of the feudal times were past; society was becoming settled and orderly; the bonds of serfdom were relaxed, and free institutions were rapidly springing up; England was governed by an able, vigorous, constitutional king (Edward I); commerce and manufactures were just entering upon that career which has given such marvelous results in our day. The unjust and bloody international wars of the fourteenth century, the relentless civil wars which accompanied them, the overthrow of free institutions in the fifteenth century, the religious wars and persecutions of the sixteenth century, the wholesale depreciations of the currency, by which the kings plundered their subjects, the building up of enormous estates in England, with the unwise poor laws, which gave the finishing stroke to the ruin of the peasantry; in France the crushing of all freedom and individuality, in Germany the surrendering of all power into the hands of a multitude of petty princes — all these things resulted in an almost steady depression of the peasantry, both in intelligence and prosperity, until very nearly our own day.

We are in fact inclined to boast overmuch of the enlightenment of the nineteenth century. I am far from being disposed to question this enlightenment, or the progress, not only in material arts and physical science, but in thought and civilization. But we should not forget that the European peasantry were the last to receive their share of the gains; and on the other hand it is well for us not to think more highly of ourselves than we ought to think, o

to fancy that our fathers, five hundred years ago, lived like the beasts of the field. Hard as was their lot, even the serfs of that period lived in a condition of comfort, on the whole, greater than that of their descendants of the last century. And the free agricultural laborers, who lived upon their daily earnings, had a better prospect before them than those of the present day; it was easier for them to lay up money and become the owners of land, and thus rise in the social scale.

It is a difficult thing to compare the condition of people at widely distant periods of time. The standard of living changes—the poorest of us demand comforts now which the richest could not afford 500 years ago. The objects of consumption change—cotton, coffee, potatoes, with numerous other indispensables of the present day, were then utterly unknown. The value of money changes,—the English shilling of 1300 had three times the amount of silver in it that the present one has; and, what is of still more importance, silver has fallen enormously in value, through the discovery of the American mines. The quality of things changes—how can we compare the coarse wool, mixed with hair, of the fourteenth century, with the fine merino which we wear? Add to this that the laborers of the middle age, from their relation to the manor, enjoyed a great many perquisites in the way of wood, pasture, rent, extra food, etc.—just like the freed slaves upon the southern plantations,—which are hard to take into account with any definiteness, and which yet complicate the account materially. Nevertheless, a few statistics, in comparison of the mode of life at the two periods, may be of interest, if we are careful to bear in mind that the comparison is only approximately accurate. I take the year 1300, because it was before any depreciation of the currency, and before the social revolution caused by the great plague of 1348.

A day laborer at the close of the thirteenth century received on an average about 3d* a day, which in American silver, is equal to about 18c.; the laborer of the present day in England receives, I believe, on an average about 2s. a day, equal to 50c. of our money, nearly three times the amount of the earlier wages. Taking, now, a few of the principal objects of consumption, we find that the bushel of wheat then averaged about 7½d. (=47c.); at the present day it is

* The modern prices here given are taken from an English price-current; all the rest of the figures are from Rogers' "History of Agriculture and Prices in England."

perhaps 6s. ($=\$1.50$); barley, 6d. ($=35c.$) to 4s. 6d. ($=\$1.12\frac{1}{2}$); fowls, $1\frac{1}{2}d.$ a-piece ($=9c.$) to 5s. ($=\$1.25$); geese $3\frac{1}{2}d.$ ($=21c.$) to 9s. ($=\$2.25$); butter, $\frac{1}{2}d.$ ($=3c.$) to 1s. 6d. ($=37\frac{1}{2}c.$); wool, 3d. ($=18c.$) to 12d. ($=25c.$). So that while money wages are not quite three times as high, corn is a little over three times as high, butter and poultry have risen enormously, while wool was then relatively dear, probably because of the great foreign demand. As to meat, it is hard to make the comparison, because it is not quoted by the pound. Professor Rogers estimates it (p. 684), at $\frac{1}{4}d.$ a pound (less than two cents); cows averaged about 8s. ($=\$10.00$), and sheep about 1s. ($=75c.$), no doubt very small, as were perhaps the fowls and geese. Of other articles, 1000 herrings cost 2s. 10d. ($=\$2.12\frac{1}{2}$); —I find them now quoted at £3 ($=\$15.$); eggs, 4d. for 10 dozen, ($=5$ for a cent); wine, 4d. a gallon ($=25c.$); pepper, 1s. 6d. a pound ($=\$1.12\frac{1}{2}$); a shirt cost $5\frac{3}{4}d.$ ($=35c.$); an axe, 8d. ($=50c.$); a hoe, $2\frac{1}{2}d.$ ($=15c.$); and a plow, one shilling ($=75c.$)

Cloth, as might be expected from the price of wool, is dear; but then we must remember that most peasants kept their own sheep, and made their own cloth. Coarse woolen cloth is quoted at 1s. 2d. ($=87\frac{1}{2}c.$) a yard (apparently a yard and a half wide); a pair of boy's shoes at 4d. ($=25c.$).

From all these facts I think it is clear that the English laborer of the fourteenth century — especially when we take into account the various small perquisites that were attached to his semi-servile condition — had a much greater command of the necessities of life than his modern representative. Clothing was dearer, but bread was cheaper, and meat and all other necessary commodities were very much cheaper in proportion to his wages. And what is true of the daylaborer is true in a still higher degree of the small farmer, for to him, a producer of wheat and wool, the high prices of these articles was a positive gain.

UTILIZATION OF WASTES OF THE FARM.

BY N. E. ALLEN, FOX LAKE.

Wastes may be considered in a great variety of ways. There is the waste of economy of force; waste by decay and the exposure

of machinery, and waste in the expenditure of money. All of these might be considered, and each would furnish food for thought and advice. I shall confine myself to the proper use of straw and fodder to secure the greatest amount of benefit; also waste of animal vitality.

Straw is generally considered as an incumbrance to be rid of in the cheapest and most expeditious manner. Usually by burning or by piling it up in the field when it is threshed, an unsightly excrescence upon the field, and suffered to remain for years to dry up and blow away, furnishing a nest for vermin and insects to breed in for the destruction of the grain of the succeeding season, such as the chinch bug and the army worm.

Frequently a pile of straw from which 400 or 500 bushels of wheat have been threshed, if left there, will not make one good load of manure — all of the ammoniacal substance is evaporated and blown away, and what remains is little better than chips for manure; a most terribly mistaken idea, equaled only in folly by the burning, and I am not sure but the burning is the best economy. Yes, I am sure it is; for it cleans the land and destroys the weed seeds that may be left in the straw. "Well," says some farmer, perhaps, "what will you do with so much straw? It fills my barnyard full in one year. I cannot make it into manure, and can only use what my cattle eat." And yet those very farmers are complaining of poor crops and hard times.

Well, my farmer friends, your economy is as hard as your complaint is loud and long; and some of you ought to be sent to the insane asylum, or to a school of economy to work, or educate some of the slovenly ways out of you. I know

THIS IS PLAIN TALK,

But you, the farmers of the northwest, deserve it. Your lands that formerly yielded from twenty to thirty bushels of wheat per acre, now do nothing more than barely pay the expenses of raising, and in many instances not half that, and still you are continuing in the same old course.

Farmers, if I could say anything to induce you to get off Poverty's Hill, or out of the Valley of Despondency, and arouse in the great public farming mind a better condition of things my object would be gained.

Well, I have scolded you long enough, and will now try to tell you my experience and observation in the utilization of straw and fodder to make feed for stock, and how to convert the refuse into manure.

First, then, it is important for the good of the grain that it should be cut early, before it is dead ripe, and immediately before it gets bleached or dried in the sun, have it put up in rough shocks and capped. Yes, capped every time. Grain that is set up and capped will be worth at least five per cent. more than that set up in long shocks, and then the straw is bright and

GOOD FOOD FOR STOCK.

And here is another idea — did you know that straw thus saved is worth very much more for manure than bleached or thoroughly ripe straw? Here again is another idea — anything that will not make good food for cattle or stock, will not make good manure.

Did you ever think that the straw you get soaked in water sometimes, and draw out on your land, and call it manure, is not worth the trouble or expense of drawing? It is simply because you have allowed all the ammoniacal substance to wash or dry out and evaporate, even before the grain was stacked, or such straw cut. It may indeed act as an absorbent of other manures that may be mixed with it, but in and of itself, it is of very little value for feed or manure. It is a convenience to have it for bedding for stock, and may thus become an absorbant then of manure, but of itself simply, I believe it is of very little value. On the other hand, if the grain had been cut when it was in the dough state and put up and capped, and allowed to dry out under the caps, it would not only have caused the grain to fill better, but the straw would have retained its nitrogenous quality, and would have made good food for cattle in some measure, and still have been rich in that quality that is so essential to make good manure.

I was going to tell about the starving process of keeping cattle, as commonly practiced. As we said, the stock in the fall are in good condition, and are starved and frozen through the winter, until they will lose from one hundred to two hundred pounds of flesh, and come out in the spring with just barely life in them, taking fully three months to thaw out, and recuperate lost vigor. Now, farmers, this is waste. The economy of this waste is to save all you have, and add more to it.

Here is a fact: Did you not know that a fat animal was worth as much again, weight for weight, as a poor animal? To make it plain, suppose I buy a steer in the fall that will weigh 1,000 pounds, for \$3 per hundred, and I add to him in weight during the winter, 200 pounds, and the whole weight is worth \$5 per hundred. I paid \$30 and sold for \$60. Now, by the other process, it has cost two-thirds as much to keep the breath of life in him, and he has lost 200 pounds, and is not worth as much, weight for weight, as in the fall (except for the custom, trying to make a little gain the next summer to sell in the next fall coming, when they hope to have them in good order again).

By one process a two year old can be made to weigh as much as the common four year old, and the two year old is worth more weight for weight, than the four year old, because he is a thrifty steer, and has never been stunted. The starving process is waste, the other is utilizing what there is of the animal, and making it available for profit.

I cannot better illustrate this than by a little personal experience. I purchased some steers this last fall, and was driving along the road, when a man hailed me and said he had some steers he wanted to sell; good ones, he said they were. He drove them up so I could see them. After looking them over I told him I did not want them. "Why?" said he. "Oh, they do not suit me." He insisted on knowing the reason, and I told him. "First," said I, "they all have thick horns; second, they have become stunted so they will never make good fattening animals." He insisted on my making him an offer, and I told him I could not pay more than \$2 per hundred for such cattle. He thought that hard. I then called him to look at a two year old steer I had (his were four years old), as large as his. "Now," said I, "I paid \$3.50 per hundred for that steer, and I can make money feeding him, and could make nothing upon yours, as at best it would sell for only third class beef in market, however well fattened." He could not see the point, and perhaps you cannot.

He had neglected the essential thing at the commencement of the growth of his animals, a neglect that can be expressed only by the old-fashioned Yankee word, shiftlessness. Yes, that is it. A man who knows enough to go and eat his meals ought to know enough to remedy such an evil; yes, such a nuisance, as it may and

does become in almost every community in the state. And right here I desire to say, that I wish every town would enforce the law against bulls running at large. It is impossible to improve the stock under such a condition of things. That is waste; or worse, it is shiftless criminality. What is true of cattle is true of almost every other animal in this regard.

Upon this point of feeding I desire to introduce a witness. I quote from Jas. F. O. Johnston, an English writer (page 607), where he estimates that "it will take one-fiftieth of the entire weight of the animal to support life and to maintain its condition, and if the food be reduced to one-sixtieth the animal will simply exist, and at the expiration of from three to four months it will be starved to death."

By giving the animal one-fortieth of its weight you bring it to a falling condition; by the use of the one-sixtieth for food, the animal, say if a steer of 1,000 pounds, will have lost in four months 200 or 250 pounds, and will be starved to death; by the use of the one-fiftieth of the weight of the animal he would be simply kept in a condition that would not lose weight; by using the one-tenth more, the animal would be fattened, and, as I have tried to show, the addition of ten per cent. in food will add to the value of the steer the difference in value, as between the \$3 per hundred and the \$5 per hundred, and the extra weight added, or plainly the addition of one-third to the cost of starving the animal to death by giving him one-sixtieth of his weight, or of simply adding ten per cent. to the cost of keeping the animal without losing in weight, would amount to \$30 addition in the value of the animal. What is true of cattle, is equally true of sheep, hogs, or horses.

We repeat, hold what you have, and add to it all you can. Never go back, cost what it will. That would be waste, the other would be economy or utilization of what would be waste.

How to use straw is of the utmost importance, not only to feed stock but that it may be made into manure. This is how I do it, and succeed in making from 1,000 to 1,200 loads each winter. We are western people, and we wish to bring this business within the ability of the western men to perform, and also to make a profit from the business. We cannot adopt the eastern method of composting; we have not the labor, neither can we meet the expense; we have an abundance of material but lack of laborers.

Firstly, then, supply yourself with the stock to feed; prepare good, warm shelter; if only of straw, that is good enough when made, and every day draw around the yard with a rope, as used in hauling straw from a machine in threshing, as much straw as your stock will pick over, and scatter it evenly, thus enabling the stock to get it easily, and to tramp it down; and in their trampling it they will break it, while it is frozen, almost as fine as chaff. Then, too, their droppings will be mixed with the straw.

After a storm of snow, let nothing, or no ordinary business, prevent from hauling straw to cover the snow, not only for the comfort of the stock, but here another idea. Did you ever think that in that fall of light snow there was a great amount of ammoniac substance brought down, that if thus composted, would be absorbed by the straw, and would be retained? I do not speak from scientific knowledge — only the knowledge of observation. Certain am I, that since I have adopted this plan, my manure is richer than before, and here is a question for the scientific men to solve. It is a fact in experience.

Another idea: How often do we hear the remark, or witness the fact, "My barn yard has a good drainage, always dry." Drained of what and where? All the soluable elements in that manure pile, and into some creek, or low place already too rich. Yes, drained of what? The very elements you want to save, and then still further to add to the waste, it is drained *so dry* as to cause it to heat and burn out, to evaporate, so, when the manure is drawn, it is little better than rubbish on the land, fit only to be burned to be rid of.

Here is a most important thing to be considered. After you have the straw and other refuse matter scattered over the yard, mixed with the droppings from the stock, the next consideration is to make it rot (I use this familiar farmer's expression because better understood), and still further to hold the ammonia generated in its decomposition. This washing and burning process is the means of more waste than is generally considered.

How shall this be secured with the greatest economy? The method recommended in many of the agricultural papers and practiced extensively, of piling the manure, in my opinion, is wrong, as it allows much of the ammonia generated, to escape by evaporation and heating.

My plan is to scatter this straw and refuse matter, as I said, as

evenly as possible over the yard, having it as nearly level as I can. Upon the drainage side I make a dam to prevent the running away, unless there is a very great excess of wet, when it should be drawn off before it becomes so completely saturated with the soluble matter of the manure pile. A certain amount of moisture must be retained or held in solution to cause it to heat and decompose. Here is one of the mistakes by the majority of farmers—they do not make the straw wet enough to cause it to rot. When, instead of the piling process as pursued by many farmers, I take a team in the month of June, when it is quite wet, and drive them over the manure, and they will poach it up. A better plan is, to feed the hogs on the pile with corn, and they will root and tumble it over, letting the air in, as the air must get to the straw before it will rot.

Brother farmers, the course usually pursued is waste. We have tried to tell you how to utilize this waste. There is not a farmer in the state that raises forty acres of grain but could keep one hundred sheep, or their equivalent in other stock, from the straw alone; and if clover is used in connection, to make the stock fat, this will be much cheaper, properly used, and thus make a profit from the feed. But the great thing, and one of absolute necessity to every farmer, if he calculates to continue on his farm, is to make this waste, as now used, into manure, and it cannot be done without the stock. A quantity of clover on every farm is most desirable. Let this idea be impressed.

Another source of great waste is, animal vitality. Let me bring an illustration to bear, and it is not an isolated case, but one of common practice. The farmer brings his stock to the yard in the fall usually in good condition, and by the freezing and starving process, or allowing the cattle to run to the stack and compel them to pull their living out of the side of the stack, when it is packed so close that it is impossible for them to get more than a few straws at a time, and that, too, pulled from a place where they have tried, perhaps, a hundred times before to do the same, breathing on it until it becomes foul with their breath, and the breath of other stock, and until it is sickening to them. Let me bring this home to you. How would you like to eat from the same plate for a hundred times without washing, where you or your comrades have eaten? Do you not think it would become disgusting, sickening? So, too, with the cattle or any other stock. “But they are animals,” says one. Yes, but they have taste as well as you.

True economy is to place fresh straw, or any other food, before your animals, and not give them more at once than they will consume, or all that is valuable for food, and *make them warm*—using the refuse feed for bedding, that it may take up the urine and droppings, to be thrown into the pile and composted with it.

Another great waste, and one too in which the great farming mind needs more thorough education, is in seeding the land, and to make the most of the seeding for profit and to improve the land. Yes, you everlasting wheat grower, I am particularly talking to you—you who have persistently impoverished the land that once raised good crops, now will not raise more than will barely pay the expense of raising, and in many instances not that. You are wasting one of the best estates God ever gave to man. How to utilize that land to the best advantage is the question that should be asked by every farmer in the state and in the west. It can be answered in one single sentence,

SEED TO CLOVER.

That will purify the land of weeds, enrich the land and enrich the owner, if properly fed to stock. You will pardon me if I am enthusiastic on this point, for I am a regular clover fanatic. Yes, I believe in clover with all my heart. How to use it with profit will be now to consider.

We suppose that every farmer knows how to properly seed the land, and we shall confine our remarks to the cutting, curing and feeding.

As soon as the blossoms are fully developed begin to cut your clover, usually about the middle of June, commencing as soon as the dew is off in the morning, and cut what you can rake and put in bunches in the afternoon after five o'clock, for you want all the sun you can get. Being put in bunches let it lay about thirty-six hours, then spread, and in an hour or two it will be fit to draw. I usually, to facilitate the cutting, cut in the afternoon after three o'clock, and cut until night; it will not become wilted so as to injure before night, so we can commence the earlier the next afternoon to put up. The hay should not have so much sun after being spread as to cause the leaves to drop off; it is better to be put up a little too damp than too dry, and salt it, about four quarts to the ton. Cutting thus early will give the second crop time to mature seed if it should fill well, which may be determined beforehand, so

as to cut for hay if it does not fill; and the second crop will make the very best feed for sheep. Right here my experience may be of interest. For the past two years I have fattened sheep on clover hay alone, not giving any grain. Yes, fattened them. I know positively about it, for I bought the sheep by weight and sold by weight. When put in last year they weighed, the two hundred, the number I fattened, on an average, $92\frac{1}{2}$ pounds. They were put to hay about the 20th of November and were sold about the 20th of February, and weighed $106\frac{1}{4}$ pounds. Paid \$3 per hundred and sold for \$5 per hundred. So it may be seen the first crop may be used for cattle feed to advantage, and the second for sheep.

Ten acres of second cut of clover will fatten eighty sheep, and after the clover has been fed to the sheep and made a good profit in the feeding, it will lose only one-fifth of its value, as has been computed, for a manuring agency. Thus the ten acres will fatten the eighty sheep and the refuse matter and the droppings will fatten from five to six acres of land if properly applied. And the first cutting fed to cattle or horses, with a suitable amount of grain, will give a good profit, and their droppings, if properly composted with the refuse, will fatten another five acres of land.

We are not done with this business yet. That clover field has now been cleaned of weeds, and the roots have come to their greatest perfection as an agent for fertilization.

Right here I wish to impress an idea, for *here is the vital point in this business.*

When these clover roots have come to this perfection, it is waste to let them remain. The point is to utilize it by breaking, and the roots now rich in that essential perfection of fertilization so necessary to promote the growth of wheat, may be used with profit. You can now raise wheat of the best quality if it can be raised anywhere. Certainly you have, by this course, put the land in the best possible condition for it.

To sum up, never let anything go back from the best condition in which you can make it. That would be waste, whether an animal or the land. Add to it and make gain.

Adjourned to 9 A. M., Friday.

FRIDAY MORNING.

Mr. Gill said, "Save the waste of our farm" should be our motto, but we must not spend more to save this waste than its value. He liked the ideas advocated in the paper, but thought there was too great a loss of straw; stock should be stabled, and much of the straw spoken of as used for bedding could be used as feed. The idea of saving all the manure which could be made upon the farm was important.

Mr. Smith stated that he made compost heaps, and if they got too dry and hot, put on water; worked his heaps over once or twice. Gas would sometimes escape, but no injury was done if the manure was not burned. Mr. Smith asked if any one could inform him where ground bone could be obtained in the west. He knew a farm at the east so run down by continual cropping that it was impossible for the owner to longer obtain a living upon it, and who could find no one to take it as a gift, until his youngest son said he would accept of it. The land was deeded to him, and in a few years, by the application of twelve hundred pounds of bone dust per acre, he had made the farm very productive, hay averaging two tons per acre, and corn and wheat crops excellent.

Mr. Wood: Phosphoric acid is necessary to vegetable growth. The farm spoken of by Mr. Smith may have been deficient in phosphates, but rich in all other elements of plant food, hence the beneficial results from the application of bone dust. Others might be disappointed in its use, hence should experiment with care. Clover was the great fertilizer for general soil improvement.

HYBRIDIZING TO IMPROVE VARIETIES.

BY GEO. P. PEPPER, PEWAUKEE.

On this subject I have talked and written before, and some of my thoughts were published years ago in the transactions of the State Horticultural Society. I now desire to ask if any one has experimented upon the suggestions then thrown out, and, if so, what progress has been made, and whether any new light has been

given this interesting subject? By hybridization the florist is enabled to improve his flowers and shrubs, the gardener his vegetables and other products; the horticulturist the different varieties of fruit; the apiarist the culture of bees, and the farmer the cereals, breeds of stock, etc.

On each of these a chapter might be written, showing where improvements could be made for the benefit of those engaged in each specialty or branch of industry.

In hybridizing, certain principles must be understood:

1st. How nature produces, whether it be plants or animals.

2d. Where such plants or animals naturally grow or flourish, as climate, and other influences have to be taken into consideration.

3d. The natural cause of males or females predominating; and,

4th. The influence the male and female have upon the new plant, seed or animal.

If we understood the above principles we could obtain, to a certainty, the desired change or improvement sought. It would seem that Jacob, the Patriarch of old, comprehended this whole subject, when he raised stock for his father-in-law on shares, to obtain his daughter for a wife; he knew the underlying principles of this subject better, perhaps, than we do to-day. He produced the speckled cattle at pleasure. Many theories have been advanced relative to the causes which produce male or female offspring, or which give form, color, or certain points in male or female desired. The intelligent breeder, by careful experience and observation, and the aid of scientific investigation, will be able to produce any type of animal desired, and possibly any sex, at will. The theory advanced by many scientific writers upon animal fertilization is, that it consists in the union of the cellular element of the male with that of the female, the former passing into the latter, and becoming lost in its tissues. The germs of a future life are here present, dependent on the union for development, but at this period where new life begins, direct paternal and maternal influence ceases, and the stronger germ determines and stamps the character of the sex. It is a very interesting subject, and one which may prove of great value to the farmer, when fully understood and practiced.

Mr. Allen asked if it was possible to hybridize wheat.

Mr. Pepper: Yes; have samples with which I am experimenting, and will explain process at next meeting. Secretary Field has also

promised me specimens of winter and spring wheat shown at the Centennial, from this state, to experiment with, the results of which I shall report in the future.

WAR AND FOOD.

BY CHARLES SEYMOUR, LA CROSSE.

The unsettled condition of affairs between Turkey and Russia, and the possibility of a war that may involve several powers, whose armies, composed of able-bodied men withdrawn from productive, useful, or industrial employments, must, nevertheless, be fed, occasions much solicitude in some countries, which, although not necessarily engaged in the impending conflict, are more or less dependent upon one or the other of the belligerents for food and traffic; and, at the same time, is regarded with profound interest by all classes of people in this country, whose agricultural products would be in greater demand, if our Russian competitors in the British food markets are to be engaged in military operations instead of agriculture. This subject is one about which no American farmer, mechanic or business man can be indifferent, as the fluctuations in the prices of breadstuffs, meats and dairy products in England, consequent upon a war which effects the supply and consumption of these commodities, are sufficient to affect all commercial and industrial interests in America.

In the threatened contingency of war between Russia and Turkey, even if Great Britain stands aloof from any active participation in the struggle, after her severe experience in the Crimean war, in which France won all of its honors, while Turkey absorbed most of its benefits, there can be no doubt that North America would derive immense benefits by the withdrawal of Russia, as our most formidable competitor, from the British grain markets, which require a larger importation of wheat and flour than the aggregate wheat production of England, Wales, Scotland and Ireland, as verified by accurate statistics derived from the official reports of the British Board of Trade. The ablest writers on the press of Great Britain have written and are writing instructive and sensible arti-

cles, which do not conceal the deep solicitude that pervades the manufacturing and commercial circles of that kingdom, in view of what seems to be unavoidable war, which the British people, or government, would gladly avert.

From a recent number of the *Scotsman*, (December 2d, 1876), published in Edinburgh, a mass of information on this topic is gleaned, that should be brought to the knowledge of all American farmers, mechanics and merchants; and as it will bear condensation, and comparison with our recent authentic trade reports by grouping the items in our vernacular, instead of adopting British terms of weights, measures and money, we will state them as concisely as possible in connection with our own data, derived from the commercial operations of the year 1876, at the various centres of our commerce. The importations of breadstuffs into Great Britain have steadily and rapidly increased from about fifty millions of bushels of wheat (including flour reduced to wheat) in 1853, to about one hundred and twelve millions of bushels in 1875. By comparing this last aggregate of British wheat importations with the reports of the American boards of trade for 1876, we learn that the total receipts of wheat, corn and flour, at New York, by water and rail, from the interior, in 1876, which amounted to about seventy-one and a quarter millions of bushels, (and about one and a half millions of bushels less than the total receipts of Boston, Philadelphia and Baltimore), would not fill two thirds of the British demand, which, during the past twenty or twenty-five years has, during peace in Europe, been measurably satisfied by receiving from Russia about one-fifth or one-sixth of the imported supply. In 1875 Great Britain received from the United States about fifty-two millions bushels of wheat, and from British North America about nine millions, so that from the United States and Canada over one-half of the British wheat importations were received.

While Chicago, Buffalo and New York complain of a reduced volume in wheat and flour receipts for 1875 and 1876, as compared with 1874, or some previous years, Milwaukee and other interior cities, and Baltimore, with other seaports, show an increase in those items of commerce. The greatest mystery is that with even cheaper lake and rail freights in 1876 than the very low rates in 1875, we find, according to the Chicago trade reports, published January 1st, 1877, that the average prices of wheat and grain at that great

trade-center of the west, during the year 1876, was lower than in 1875, and below the average price of any year since the civil war, while the British wheat market averaged, in 1876, two shillings and eleven pence sterling per quarter, or about nine cents per bushel higher than in 1875. This may be explained partly, by the fact that our western wheat in 1875 was inferior, and some dishonest shipments did not come up to the sale samples in Europe, so we suffered in the British markets of 1876 for our rascality in 1875; and, too, much of the American wheat that reached Europe in 1876 was from the inferior crop of the previous year.

A war, to which one of the great European powers is a party, will compel several, if not all of the other great powers of Europe to be ready for an emergency, as nations in conflict are apt to tread on the toes of bystanders, until all are brought into a defensive if not an aggressive attitude. At such a time cheap food is one of the most important sinews of war or sources of strength, and consequently exportations of breadstuffs cease in those countries that have withdrawn large bodies of men from industry into warfare or military establishments. To illustrate this point, as well as to establish the fact that a manufacturing country like England requires more food than it produces, we may consider that the total wheat productions of Great Britain in 1875 amounted to about ninety-eight millions of bushels, or about fourteen millions of bushels less than were imported, and that during the Crimean war, from October, 1853, to May, 1856, when Russia was fighting Turkey, France and England, instead of sending wheat to the British and French markets, the price of breadstuffs rose eighty-one per cent above the prices in times of peace, before and since the war, and stood for nearly two years at about \$2.50 per bushel, or 80s per quarter, the maximum having been 80s and 10d per quarter in England. The English operative found his loaf of bread cost 14c instead of 8c. This increase in the price of breadstuffs in war extends to other articles of food, and the result is that when the poor and hungry operatives of England are sadly perplexed to make their scanty wages purchase food at an advance of eighty per cent. on peace prices, their employers find it impossible to raise their wages in proportion to the increased cost of living, and the employes become weary, disheartened, weak and unprofitable. The greatest protection our manufacturers have is in the comparative cheapness of food as an offset to the cheap labor of Europe.

The average price of wheat in England during 1875 was forty-five shillings and two pence sterling per quarter of eight bushels; or, computing the sterling shilling at twenty-four cents and the sterling penny at two cents, say \$1.35½ per bushel. In 1876, under the influence of war talk and war fears, the average price has been forty-eight shillings and one penny per quarter, or about \$1.44¼ per bushel. Each advance of ten cents per bushel on England's wheat consumption adds about twenty-one millions of dollars per annum to the cost of her food.

The acreage of the wheat crop in the United Kingdom is stated by the British Board of Trade at about three and a half millions of acres, the average yield of which is about twenty-eight bushels per acre; but Great Britain has nearly six millions of cattle, of which about two and a quarter millions are cows; and it has over twenty-eight millions of sheep, which, however, are nearly one million less in 1876 than in 1875. With a present population of about thirty-three and a half millions of people, Great Britain has demonstrated the value of manufactures and diversified industry to the land owners, who derive enormous revenues from their land rents, which are as high as the cost of average improved lands in America.

If Russia goes to war, it is not likely that prices of bread-stuffs will reach the Crimean war prices again, unless there shall be a general fight "open to all comers," as North American agriculture, both in the United States and Canada, as well as that of the East Indies, Australia, Chili and other countries, is now on a larger and more diversified scale; and as greater attention is paid on both continents to dairy products, sheep culture and stock raising; but so long as any solicitude is entertained about, or possibility exists for a war, in which any of the Great Powers of Europe may be involved, there will be light exportations of food from other countries to England, and consequently the benefits of good markets must accrue to the farmers of the United States and Canada.

Correspondents of London and Vienna journals estimate the available fighting force of Turkey at about 700,000 well equipped and fearless men. If so, the war will not be a brief or feeble one.

These considerations, however, are not sufficient to justify any American producer in gambling on the results of pending negotiations, by refusing to sell his farm products at the present remunerative prices; for the announcement of reconciliation and peace

would play smash on the markets; and if war is inevitable, it will bring legitimate benefits to the farmers of this country in the next crop; as the ravages of war are not repaired in a season, after conscripts have been transferred from their home farms to camps in foreign lands.

The greatest damage that the Eastern war may bring upon us, is to stimulate wheat culture: but every sensible man will comprehend the fact that the concentration of the most value and nutriment in food for markets is as important in war as in peace; and that a pound of cheese, beef or pork, worth ten to fifteen cents, can be conveyed to the hungry operatives and active armies of Europe with as little cost for transportation as a pound of wheat that may be worth from two to three cents. On compact and valuable shipments, the transportation companies and "middle men" get a smaller proportion of the total proceeds than on the more bulky and cheaper grain shipments. If war comes, make the most of it. If peace comes, be on the safe side.

No stronger statement of the exhausting process of wheat culture can be found than the estimates given by the Agricultural Bureau of the United States for a series of years, extending from 1850 to 1876, inclusive; from which we learn that notwithstanding a greatly increased acreage of wheat crop, with the settlement of the new states and territories of the west, the aggregate yield of 1876 was about the same as that of either 1868, '69, '70, '71 or '72:

In 1850 it was about	100,000,000	bushe's.
In 1860 .....do	173,000,000	"
In 1867 .....do	212,000,000	"
In 1868 .....do	224,000,000	"
In 1869 .....do	260,000,000	"
In 1870 .....do	236,000,000	"
In 1871 ....do	231,000,000	"
In 1872 .....do	250,000,000	"
In 1873 ...do	287,000,000	"
In 1874 . ...do	300,000,000	"
In 1875 .....do	294,000,000	"
In 1876 .....do	245,000,000	"

Secretary Field.—The importance of the wheat crop of the country calls to my mind the shiftless manner of caring for wheat after it is raised and after it is cut, and before it is safely secured in the stack. Do not be afraid to cut wheat when the kernel is in the stiff dough, even if the straw is quite green; and do not fear if the weather is damp, cut, bind and shock in round shocks, and cap

well with two bundles. If the straw is a little green it will shrink and admit air, and cure perfectly. I think farmers might commence cutting their wheat two to four days before they generally do, with great profit. After wheat is nicely shocked, keep it so until stacked or hauled to the barn. If a storm comes and blows down the shocks, or the cap bundles off, have them set up again. Thousands of bushels of wheat were lost in the northwest two years ago for want of care and protection; from shiftlessness and want of care at the proper time.

Mr. Smith. — I am sorry to say that such farmers as Secretary Field has pictured are too numerous. I don't think they are to be found in this convention, however, and such seldom read the volume of Transactions or any agricultural paper, hence it is hard to reach them and cause an improvement in their modes of farming.

Mr. Webster said he had a neighbor who, when he asked him if he was coming to this convention, said he did not know that such a meeting was to be held. He did not take a paper — couldn't afford it. Mr. Webster thought if he would give him a copy of the Transactions he would read it.

Secretary Field. — Give him a copy, and ask him to let his neighbors read it too. We must educate these men to be better farmers and hence better citizens.

ROOT CROPS FOR THE FARM.

BY J. W. WOOD, BARABOO.

As a subject for a paper, the raising of roots for farm use is by no means a novel one. It is a common topic in the agricultural press, and the subject is professionally treated in all the leading works on farming and gardening, but yet we all see objects from different standpoints, and mine being exclusively that of a farmer, with but ordinary farm resources to command, it may be appropriate to offer it to the farmers of this convention. I shall not begin by suggesting the southeast slope nor fifty cords of manure to the acre, nor subsoil plowing twenty inches deep, though all of these are desirable if a person can command them; my aim is to give the

results of my own experience, with no attempt to compare methods with others, yet I could easily be persuaded that there are methods which would give results superior to my own.

In our convention a year ago, the subject was incidentally brought up, and challenged a degree of interest, which led me to believe that it might, with propriety, be more formally introduced to the notice of this meeting.

My first crop of roots were raised and used solely as adjuncts to other feed crops.

They filled the place of bran, which I was accustomed to buy at the mill, in so satisfactory a manner, that I continued extending the area devoted to them, until a year ago, I found myself in possession of 1,200 bushels or more of them, and with my corn entirely cut off by an August frost.

I had hogs both to fatten and to winter. I cooked the roots freely for those I fattened. They grew rapidly, and with some meal towards the last, they made very good pork. The pigs that I wintered were fed entirely on uncooked roots, giving them not so much as an ear of corn, or its equivalent, for more than a year. I only hoped that they might survive on starvation rations just like a shipwrecked crew, but to my surprise, I kept them growing and in good condition until grass came in the spring.

My chief regret since has been, that I had so little faith in them, for I might as well have wintered such numbers that they would have been a great help to me this fall. I fed them freely to my cows and horses with very satisfactory results. I am now wintering hogs on a daily feed of roots and one of corn. I shall greatly extend my acreage of roots the coming season.

I find that they are greedily eaten by all kinds of stock, even when fed heavily with grain. Fattening hogs will eat of them at every meal, even though the floor is covered with the best of corn. Horses will perform ordinary labor on a diet of roots, and show by their sleek condition that they are on satisfactory rations.

The only drawback lies in storing and handling a sufficient quantity of them, for they are bulky and heavy, and must be protected from frost. A convenient arrangement for this purpose is an absolute necessity; without it, a man can do little more, profitably, than to raise enough for the health of his stock, and this many he should by no means be without.

They may be secured until spring in pits, and when freezing weather is past, they can be thrown upon the barn floor or in any other convenient place, and fed as required. If a man will but observe how his own system craves, and is benefited by green food in the early spring, it will prepare him for sympathizing with his stock when he sees them gnawing the old tufts of frost bitten grass.

I believe that no investment in crops will pay better than to raise as many roots as can be handled, even with some inconvenience.

If especial arrangements can be made to accommodate them, so much the better.

In raising roots, I find that good culture is indispensable; the ground should be plowed both in fall and spring. Deep plowing is very desirable, as the roots are likely to terminate abruptly when they reach the bottom of the furrow. I have derived great advantage from double plowing. To do this to advantage requires two teams. The leading plow turns a good deep furrow; this is followed by another plow set to run in the same furrow, but to as great a depth as is profitable for the team. I have a plow with a narrow, long and slanting mould board, which I find useful for this business. It throws but little of the subsoil to the surface. In this way I can stir the ground to the depth of 12 or even 14 inches. In the spring the ground is plowed and thoroughly harrowed. It is then thrown into ridges about 30 inches apart. To do this I throw the first ridge into a dead furrow by going around with the team. I then drive with the near horse in the furrow, tipping the plow into its land side, and setting the clevice so as to give the desired width. In this way a ridge is made by a single passage of the plow. I made a wide, light harrow of 2x4 oak, set thickly with wooden teeth. It is drawn by one horse, with this I pass once in each furrow, so that each ridge is harrowed back and forth. This levels the top of the ridge, rolling the little lumps out into the furrow, leaving the surface in an undulating form, rather than in decided sharp ridges. It is now ready for the seed. I plant with a wheelbarrow drill at the rate of about five pounds of seed to the acre. A smaller quantity of good seed would still require a great deal of thinning out, but it is safer to seed heavily as the young plants assist each other in breaking the crust, provided the ground should be packed by heavy rains.

The roller of the drill leaves a slight depression in the line of the

seed, and this depression will show a line of moisture when the adjoining surface is dry. This facilitates their sprouting and breaking up the crust; it also assists in early culture, as it marks very plainly the line of the row, obviating the necessity of sowing radish seed, as recommended by some. As soon as the plants are fairly up, I go into the patch with my one-horse plow. I prepare the plow for the business by setting a rolling coulter in such a way as to form a perfect shield next to the row. This is to enable me to plow close to it, and yet keep the dirt stirred by the plow from covering the young plants. It is important to work very closely to the row, as it greatly reduces the labor of after culture. An implement which could be passed rapidly along, and cultivate about four inches on each side of the row would be desirable. Such wheel hoes are made which will work on level ground, but, in reply to some correspondence, I have been told that they will not work upon my ridges. With four inches of latitude for my plow and coulter, I could do very perfect work. One object in planting on the ridge is, to have the furrow into which all of the lumps and rubbish can be moved in the early working. With the row as low as the general level, it would be difficult to protect it.

The greatest item of labor connected with raising a root crop lies in getting them properly thinned out. It is absolutely essential to a good crop that this should be done in season.

I made careful observations while harvesting my roots this fall, to determine what distance apart it was best to have them in the row. I fixed upon from four to five inches for the large varieties of carrots, and just twelve inches for the large beets and mangels. The richer the ground the farther they should be apart. Some experiments reported by Mr. Lane in the *New York Tribune* gave eighteen inches for the greatest yield of mangels, but I am persuaded that this must have been on better ground than mine. While the beets are small they will look rather thin at a foot apart, but it is an advantage for them to know at once what space they are expected to fill, as they will make a greater push for it than they will if once choked, and thinned down gradually to the proper distance. The rows being so wide apart the plants can spread themselves laterally, if they feel a little crowded in the row. This labor of thinning must be done primarily with the fingers. A man must get right down to the work. There is always a chance for

selecting the plant to be left. It must often be held in its place with one hand, while the other is pulling out the superfluous ones and the weeds. Female fingers are very expert at this business, and it is often the case that, at a definite price per row, the neighboring girls will make a bee and do the job up quite expeditiously. For the remainder of the season a common cultivator, made adjustable in width, is all that is necessary.

All the operations must be thoroughly performed. I have had no experience on the farm which has taught me the importance of thoroughness equal to this matter of growing roots. Everything must be well done in order to reap success. The rows must be straight, the ground in good heart, and under good culture; the cultivation must be prompt, and then success is almost certain.

I have never raised less than five hundred bushels from an acre with my poorest culture, and have raised nine hundred without extraordinary efforts.

I have no resources but those of the ordinary farmer. I am too far from the village to cart manure. Every third year my land is in clover, and this keeps it up so that I feel at liberty to use my manure on my garden first, on my root patch next, and on my corn ground last.

I have heretofore preceded my roots by potatoes on a clover sod, as the result of some experiments. I have concluded to plant them the coming season directly on a clover sod; to this end I have turned under five acres. As fertilizers, I shall make use of what ashes I can get—shall put on the waste of my lime kiln, and such manure as I may have in fit condition. It will not in all amount to much of an application. I shall rely mainly on the virtue of a clover sod, and in this I have great faith.

In reference to my experience with varieties, I have tried rutabagas, mangels, sugar beets, carrots and parsnips.

I have raised good rutabagas, but have found them beset by many insect enemies while small, and then they are sometimes permanently stunted by hot, dry weather. I once raised a great crop by sowing the seed broadcast on new land. They carry more dirt than other roots, and are eaten with less relish by stock. I have better success with other roots. I use them to fill vacancies in the rows, as they may be sown as late as the middle of June, or even a few days later.

On rich ground and with good culture, I think that the giant mangels will yield the greatest amount of feed to the acre, but under less favorable circumstances and treatment, the crop will be meager, and not equal to the sugar beets. They are not so well provided with foraging rootlets as the latter. They stand so far out of the ground that, while it is a great help in harvesting them, it exposes them to all untimely freezing in a greater degree than any other root. If they are sensibly frozen, it will greatly increase their tendency to rot. I should plant of them not more than the quarter of my crop.

The white Belgian carrot has given me the best satisfaction of any root which I have raised. It does not burrow so deeply as the long orange, but yet is not easily injured by early freezing. It has some tendency to run up to seed, but not enough to sensibly injure the yield. The long orange was fully up to it a year ago, but in the past season has fallen decidedly behind it.

The American sugar beet was my best crop the past season, and I propose giving it an important place in the future. It is harder to dig than the mangels, because of its burrowing habits, but this guards it against untimely freezing. I have several times tried the globe mangels, but they do not seem capable of so great yields as the other roots. The only drawback in the culture of parsnips is the difficulty in harvesting them. They cling so tenaciously to the ground that it is difficult to pull them, even with a deep furrow plowed by their side. They will yield about two-thirds as many bushels to the acre as carrots, are easy to keep, are relished by stock, and I purpose increasing the area which I give to them.

In harvesting the mangels, we top them as they stand in the row; the wagon is then driven along by the side, and they are thrown in without difficulty. They are dropped from the wagon through a hole in the granary floor, where they lie until taken up for feed. The sugar and other beets are topped in the same way, but a person digging them will want a spade to strike down by their side to start them, when with a slight blow against the spade handle, to jar off adhering dirt, they are thrown into the wagon.

In harvesting the carrots, we take out a row in the middle of the patch, and then by back-furrowing, throw away the dirt from the succeeding rows. The plow is set to run narrow and deep, and we plow three furrows to the row. We aim to run as closely to the

row as possible without bruising the roots. We then pass along the row topping the carrots, dropping the leaves into the furrow, and throwing the roots on to the plowed ground. A team is busily employed in gathering them. We use no basket, but throw them at once into the wagon. In this way the ground is left thoroughly plowed. Instead of waiting for the roots to be removed, the team with the plow goes on with its work on some adjoining land, so that no time is lost. I have had no difficulty in keeping my roots after they were stored, unless with the long mangels after they were severely frozen. Still, I would not think it safe to pile them up in very large piles without taking some precautions to keep them from heating. I think that a slatted tube running under the pile, and up through the center of it, would be all that is necessary for that purpose. Simply breaking the roots while handling them does not cause them to rot.

The subject seems to require reference to such tables of equivalents as are furnished by scientific analysis, and I presume that Prof. S. W. Johnson, in his work, "How Crops Grow," gives us the most reliable data at present obtainable.

Without entering into too minute details, the organic matter contained in a bushel of corn would be equal to that found in 6.8 of carrots, 7.5 of field beets, 7.5 of parsnips, 7 of rutabagas, and 3.4 of potatoes.

I could safely give the average yield of my roots for three years past at 650 bushels per acre. According to the table of equivalents, this would be very nearly equal to 100 bushels of corn, or one acre in roots would be fully equal to three acres of the average corn crop of the state.

If the organic matter of the roots is equal in value, for feeding purposes, to that in the corn, being diffused through a larger and more yielding mass, must be more thoroughly comminuted, and when the texture is broken down, must be more readily yielded to the absorbents of the animal. In proof of this I would say, that where cattle are fed with corn in the ear, store hogs are kept to work over the droppings, and a proper number of them will need no other food. The cattle are a mill and steam chest, to prepare their food for them. If the corn is ground, it will be more perfectly assimilated, but still there will be waste.

I am feeding five cows on ground feed, and to others I am giv

ing roots; my hogs have learned perfectly well which cows are eating the meal, and attend them diligently when they are turned out, while they are indifferent to the acquaintance of the others. From this it would seem that with hogs the proof of more things than pudding lies in the eating, and I am satisfied that there is more waste in feeding the grain than the roots.

In reference to the comparative cost of raising roots and corn, I think the following to be a reasonably correct statement of it:

The plowing I would call the same; the after fitting for the roots I would place at double of that for corn. The labor of planting is the same; the cost of seed for the roots is from two to three dollars per acre; the labor of cultivation is about the same, with the exception of the first thinning of the roots. I have hired this done by the row, at a cost of \$7.00 per acre for carrots, and \$5.00 for beets. The harvesting is done before husking is ready. Two men in the field will keep a team constantly hauling at the rate of two hundred bushels per day. The plowing of the carrot patch has to be done in any case, and need not be charged to the roots. While harvesting, the finest roots are to be thrown aside and preserved for seed. It is surprising how few perfectly typical roots will be found. I aim in all cases to raise my own seed, though the importance of this has but just fully dawned upon me. I have sown annually from the same package of beet seed for six years, and the last grew as well as the first. This long vitality will enable a person to raise enough in a single season to last for several years, and he need run no risk of mixing by raising different varieties in the same season. Carrot seed is not reputed to be reliable beyond the second year, and parsnip seed should always be fresh. I have sown turnip seed for eight years with equally good results.

When a man has a plenty of land adapted to corn, and has but poor conveniences for handling roots, it is doubtless better for him to raise corn for general feeding purposes, limiting his roots to the amount necessary for the health and relish of his stock. Corn, if successfully cribbed, will keep for years, while roots are perishable, and need to be protected from frost. It is necessary to make special provision for storing them; this is the greatest hindrance to their general cultivation. I have, during the past season, built me a cave of stone work, capable of storing five thousand bushels. In addition to this I have a cellar, in connection with my hog pens,

which will hold twelve hundred bushels. I aim to fill them both the coming season.

A few words in reference to the general outlook for farmers, and I am done. That times are dull and hard is a proposition proved by our own consciousness, still the prices for many things are good, and we can safely say that our misfortune is that we have so little to sell. The straight road to relief lies in redoubling our efforts for production; not blindly sowing wheat after wheat, until the earth is tired of us, but diversifying our crops, and above all things, before we plant or sow, be sure that our land is in a fit condition to produce the crop which we ask it to yield.

We cannot control the elements, and they are sometimes against us, but we can prepare ourselves for many contingencies, and possibly escape serious disaster. The failure of one crop is often attended with conditions highly favorable to others. Corn and wheat thrive best under somewhat opposite conditions, and then again roots will be likely to give their greatest yield when corn is backward, and possibly cut off entirely. These things may well teach us to plant different crops, but in no case to relax our efforts.

I have more than once witnessed greater depression in agricultural interests than has existed lately, and have seen them give way to abundant prosperity. I feel perfectly assured that there is a good time coming. I never felt more resolute in looking after the good of my land than I do at present. I aim to keep it in good heart and under good culture, so as to be prepared to make the most of such opportunities as may come.

In conclusion, I would call your attention to the old proverb, which says that "The man is always the nearest to market who has the most to sell."

Secretary Field asked if any member of the convention had ever raised artichokes. He had seen several articles upon their value as food for pigs, and thought their culture might be profitable.

Mr. Brooks, of Madison, stated that he had been experimenting in a small way with the Brazilian artichoke, and was of the opinion that it can be cultivated with profit to those engaged in pork raising. It can be grown with little expense, as compared with corn, and the pigs will do the harvesting, and sufficient seed will be left in the ground for the next crop, only requiring leveling with the

harrow when the hogs are taken from the field. The tops, if cut and cured when a little green, are said to make very nutritious food for cattle, and are much relished.

Mr. Webster said that he had been troubled to keep his man-golds the last year — rotted badly. Had excellent success in raising, but if the cellar is warm enough to keep from freezing they would rot, and hence were worthless.

Mr. Tuttle stated that he had grown various kinds of roots with success, but had also been troubled with their rotting. He liked the Russian turnip best, had raised 600 bushels per acre; were good for table use and for animals. Raised 4,000 bushels last year, at a cost not exceeding three cents per bushel. Sowed the last of June. If sown too early, will be hollow. They keep well and sound.

Mr. Smith had been very successful in beet culture; said he sowed on the 18th of May, 1876, the yellow globe, in rows two feet apart, and produced 2,466 bushels per acre; considered them valuable food for stock, very nutritious and healthy.

The session closed by the adoption of a resolution introduced by Mr. Plumb, and variously amended, to so fix the assessment law as to require assessors to return the product, in bushels, of grain, as well as the acreage to the Secretary of State, and to include also apples, grapes, flax seed, the cultivated grasses, cultivated cranberries, and the acreage of timber.

Adjourned to 2 P. M.

AFTERNOON SESSION.

On motion, the culture of root crops was again taken up.

Mr. Brown: What land is best for root crops, old or new?

Mr. Smith: Very little difference. Good corn land is good for roots. The soil should be stirred deep, and made rich. For weeding, boys and girls are better than men; will do more and at less price. Suitable soil, with good cultivation, will almost invariably bring success.

Mr. Baker said he came to the convention to be instructed and to impart information also. English farmers raise roots, and make it profitable. The climate of England is suited to their cultivation, and they can keep them in the ground till wanted for use. Didn't

think it would pay to raise roots to feed in this country; poor food for winter. Said he knew a man in Ohio who said water was good in its place, but for a common drink, give him rum. So of roots, they are good in their place, but for common, nutritious, valuable food, give him oats and corn for cattle and hogs, and the same, with a little flax seed added, for horses. Could make more money from such feed than from roots.

Mr. Lewis asked how to kill Canada thistles.

Mr. Pepper: Pasturing sheep upon the land, or frequent plowing will exterminate them.

Mr. Daubner: You can kill them in two years by mowing once a week all summer.

Mr. Wilson: Haven't been able to kill them by mowing; they seem to come from roots which have lain dormant in the ground for years.

Secretary Field: The trouble is, I think, with Mr. Wilson, that he doesn't do his work effectually. He allows a few thistles to go to seed, and then, perhaps, plows the seed under deep, and when brought to the surface again, grow, even after many years; think he is mistaken about the roots living in the ground over one or more seasons without growing, and then years afterwards under more favorable circumstances, sending up shoots.

Question: How can I get rid of the weed known as snap-dragon?

Mr. Pepper: Treat it the same as the thistle.

Mr. Thomson: Summer fallow the land and you will be rid of this pest.

The business of the Convention appearing to be completed, Secretary Field said that it had been his duty as well as his pleasure to call and attend these conventions. He hoped, if that duty should no longer be imposed upon him in an official capacity — and he thought it would not, he should still have the privilege and pleasure of meeting with them and taking part in their deliberations. It was impossible not to be benefited, where so many able and instructive papers were read and commented upon by men of such intelligence and practical experience. The attendants at these conventions could not only improve themselves, but could impart much useful knowledge, gained by this interchange of ideas, to others who were so unfortunate or indifferent as not to be present. Farm-

ing was the foundation of all other interests, and if that did not succeed, nothing else could. He expressed his gratification that so many representative men had been in attendance at this session, and exhibited so many proofs of their intelligence in its deliberations. He had done what he could through circulars and press notices to have the attendance more general, but there were some men who neither attended conventions nor read newspapers, and of such there was little hope. He trusted those who did attend would go home and set their less attentive neighbors to thinking upon these subjects, which were so vital to their success as farmers. Attending the great exposition, and witnessing the gratifying success of our agricultural exhibits, he had felt proud that he was a farmer. That class did not yet occupy the position to which they were justly entitled, but they could do so if they would only assert and stand by their own interests, in their organized capacity. He thanked the convention for so efficiently seconding his efforts, and for contributing so much to make this convention a success.

Mr. B. F. Adams moved that the thanks of the convention be tendered to the officers thereof for the able manner in which its deliberations had been conducted by them. The motion was unanimously carried.

Mr. J. M. Smith, the presiding officer, thought the intimation of Mr. Field, that he contemplated retiring from the secretaryship of the society, would meet with opposition, and that he would not be permitted to abandon his post. Mr. S. had attended all the conventions held by this society, and he considered this the best of all, and hoped these meetings would go on increasing in interest and utility to the farmer. He was a farmer, and the son of a farmer — a good one — had been well trained in farming, but had gained very much valuable information at this convention. It had perhaps cost him more than any other member, to attend, but the expense was a first class investment.

On motion of B. F. Adams, the convention adjourned, *sine die*.
For the Executive Board.

W. W. FIELD, *Secretary*.

ABSTRACT OF COUNTY AGRICULTURAL SOCIETIES FOR 1876.

COUNTIES.	OFFICERS OF THE SOCIETY.			PLACE AND DATE OF FAIRS.		FINANCES.			
	Presidents.	Secretaries.	Treasurers.	Place.	Time.	Receipts.	Expenses.	Prem's.	Am't in treas'y.
Adams.....	J. M. Higbee.....	F. B. Hamilton.....	A. F. Hill.....	Friendship.....	Sept. 21-22	\$202 00	\$21 00	\$125 00	\$56 00
Boscobel Ag. and Driv. P'k Ass.	G. F. Hildebrand.....	T. J. Brooks.....	T. Kronsage.....	Boscobel.....	Oct. 4-6	1,997 75	956 75	1,692 00	376 17
Buffalo.....	F. Gilman.....	J. W. DeGraff.....	Henry Waelty.....	Lincoln.....	Sept. 20-22	689 30	318 10	261 50	137 83
Clark.....	James Hewett.....	J. F. Canon.....	J. B. Jones.....	Neillsville.....	Sept. 26-28	978 76	567 45	411 31	488 61
Columbia.....	R. C. Rockwood.....	L. H. Doyle.....	J. Q. Adams.....	Portage.....	Sept. 26-28	1,235 22	413 72	121 50	.....
Central Wis. Mech'l & Ag'l Soc.	J. H. Sleeper.....	V. W. Seeley.....	.....	Watertown.....	Sept. 25-29	1,737 51	941 00	900 00	.....
Columbus Union Ag'l Society...	C. Ross.....	C. L. Duing.....	M. Adams.....	Columbus.....	Oct. 10-13	1,917 99	598 19	1,319 80	.....
Crawford.....	Gilbert Stewart.....	F. Mills.....	D. W. Briggs.....	Seneca.....	Sept. 20-23	765 75	525 25	240 51	.....
Dane.....	M. Anderson.....	Geo. C. Russell.....	W. T. McConnell.....	Madison.....	Sept. 19-22	3,413 83	1,534 33	1,879 50	17 62
Dodge.....	S. Eastman.....	J. H. Dunham.....	B. Randall.....	Juneau.....	Oct. 10-12	542 20	118 10	424 10	.....
Door.....	Ruf. M. Wright.....	H. F. Scudder.....	C. H. Masse.....	Sturgeon Bay.....	Sept. 29-30	238 30	100 25	138 25	.....
Eau Claire.....	J. C. Hackett.....	M. M. Russell.....	C. Backman.....	Augusta.....	Oct. 10-12	707 35	75 35	632 00	.....
Fond du Lac.....	Chester Hazen.....	D. C. Lamb.....	H. G. Halstead.....	Fond du Lac.....	S pt. 26-29	2,350 20	1,105 70	1,424 50	116 96
Grant.....	H. A. Moore.....	T. F. Baldwin.....	W. W. Robe.....	Lancaster.....	Sept. 27-29	988 55	262 80	785 75	9 25
Green.....	J. S. Smock.....	A. S. Douglas.....	S. W. Abbott.....	Monroe.....	Sept. 27-30	4,330 72	2,719 47	1,611 25	.....
Iowa.....	J. Elwood.....	J. T. Pryor.....	Samuel Hoskins.....	Dodgeville.....	Sept. 26-28	1,971 25	1,134 25	837 00	490 11
Jackson.....	Wm. T. Price.....	John Parsons.....	S. W. Bowman.....	Black River Falls.....	Sept. 26-28	452 50	101 75	350 75	.....
Jefferson.....	C. H. Stoppenb'gh.....	G. J. Clapp.....	S. Brown.....	Jefferson.....	Sept. 19-22	2,369 59	1,459 09	890 50	.....
Juneau.....	I. H. Stewart.....	R. A. Wilkinstn.....	M. Temple.....	Mauston.....	Sept. 20-22	873 60	204 60	669 00	0 56
Kenosha.....	F. Robinson.....	H. H. Tarbell.....	W. S. Maxwell.....	Kenosha.....	Sept. 19-21	1,705 07	859 03	846 03	99 72
Kewaunee.....	.....	J. A. Whitaker.....	.....	Kewaunee.....	Oct. 5-7	220 25	161 85	58 40	.....
La Crosse.....	C. L. Hood.....	W. J. Dudley.....	.....	La Crosse.....	Sept. 26-28	1,221 71	399 70	812 06	257 08
La Fayette.....	N. T. Parkinson.....	J. Me'h'n.....	F. W. Stiles.....	Darlington.....	Sept. 2-22	1,286 90	580 95	706 00	27 34
Manitowoc.....	W. Cary.....	J. J. Lyons.....	.....	Clark's Mills.....	Sept. 28-30	618 26	237 75	380 50	198 30
Marathon.....	A. Kirkbusch.....	V. A. Algerson.....	.....	Marathon.....	Sept. 22-23	790 75	421 00	369 75	435 94
Marquette.....	C. Hauslet.....	S. A. Pease.....	S. D. Perkins.....	Montello.....	Oct. 4-5	269 80	144 05	120 75	.....
Monroe.....	C. E. Hanchett.....	A. E. Howard.....	T. B. Tyler.....	Sparta.....	Sept. 28-30	840 46	472 18	361 27	.....
Ozaukee.....	A. M. Alling.....	Chas. Wilke.....	W. Vogeltz.....	Cedarburg.....	Oct. 3-4	334 95	165 90	169 05	21 82
Oconto.....	W. G. Donaldson.....	Matt Finnigan.....	C. S. McKenzie.....	Gillett.....	Oct. 3-5	278 94	219 49	49 50	23 34
Pierce.....	J. S. Copley.....	H. A. Jay.....	Geo. Trachout.....	Prescott.....	Sept. 22-23	369 55	181 05	188 50	85 64
Portage.....	W. V. Fleming.....	A. J. Smith.....	W. Lotz.....	Amherst.....	Sept. 19-21	752 65	438 80	313 85	.....
Racine.....	N. D. Fratt.....	E. D. Perkins.....	W. E. Chipman.....	Burlington.....	Sept. 16-9	2,167 43	973 68	1,193 75	149 52
Richland.....	J. M. Thomas.....	A. L. Ha'ch.....	D. L. Downs.....	Richland Center.....	Oct. 10-12	885 55	195 40	690 15	99 12
Ripon Agricultural Society.....	F. Hammond.....	B. King-bury.....	J. F. Litell.....	Ripon.....	Sept. 19-22	1,735 20	545 20	1,180 00	.....
Rock.....	Geo. Sherman.....	R. J. Richardson.....	C. Miner.....	Janesville.....	Sept. 5-8	2,586 23	1,676 63	909 59	.....
Sauk.....	H. H. Patten.....	J. M. True.....	H. Cowles.....	Baraboo.....	Sept. 19-21	1,032 08	316 72	715 36	.....
Shawano.....	E. T. Sawyer.....	D. H. Pulcifer.....	.....	Shawano.....	Sept. 26-28	608 06	351 56	256 50	1 41

Sheboygan	J. F. Moore	J. E. Thomas ..	M. D. Hotchkiss	Sheboygan Falls.	Sept.	20-23	671 10	242 64	394 41	34 05
Sheboygan — German	Geo. Piefer	F. Stœsser	Carl Reich	Sheboygan	Sept.	26-28	1, 181 77	948 25	233 52	24 84
Southwestern Industrial Assoc'n	J. H. Vivian	T. S. Ansley	T. Priestly	Mineral Point ...	Sept.	5- 8	4, 469 73	2, 582 73	1, 887 00	.....
South. Wis. & Nor. Ill. Ind. Ass.	R. J. Burdge	M. S. Hinman ..	S. C. Moody	Beloit	Sept.	18-21	3, 102 66	2, 113 91	988 75	174 50
St Croix	R. Bailey	R. R. Young	A. D. Richards'n	Richmond	Oct.	26-28	1, 239 45	748 45	481 00	389 15
Trempealeau .....	.....	R. A. Odell	A. H. Kneeland	Galeville	Sept.	19-21	1, 529 95	313 95	216 00	21 07
Vernon	P. McIntyre ..	A. D. Chase	E. Powell	Viroqua	Oct.	3- 5	596 20	201 95	394 25	791 15
Wauworth	John Jeffers	S. G. West	H. Latham	Elkhorn	Sept.	26-29	5, 038 75	2, 811 75	2, 227 00	736 51
Washington	L. F. Frisbee	John Peck	C. H. Wilke	West Bend	Sept.	27-29	5, 994 43	531 68	462 75	.....
Waukesha	W. A. Nickell ..	Geo. C. Pratt	W. S. Hodson ..	Waukesha	Oct.	3- 6	1, 473 99	861 69	612 30	12 78
Waupaca	J. M. Baxter	F. W. Sackett ..	L. L. Post	Weyauwega	Oct.	12-14	840 90	670 40	210 00	...
Waupaca Agricultural Associa'n	.....	Myron Reed .....	.....	Waupaca	Sept.	26-28	743 03	352 23	390 80	14 34
Wauchara	J. N. P. Bird	W. S. Munroe ..	S. M. Olds	Wautoma	Oct.	4- 6	1, 492 28	1, 349 48	142 80	.....

EXPERIMENTAL FARM.

BY W. W. DANIELLS, M. S.,

Professor of Agriculture and Chemistry, in the University of Wisconsin.

REPORT OF EXPERIMENTS

Conducted upon the University Experimental Farm, for the year ending September 30th, 1876, together with a summary of Meteorological observations taken at the University, for the years 1875 and 1876.

WINTER WHEAT.

The following varieties were sown September 6th, 1875, with $1\frac{1}{2}$ bushels seed, by measure, per acre, on barley stubble. Soil a sandy loam. Twenty loads of well rotted stable manure were put upon each acre before plowing.

Fultz. — Winter killed by the thawing and freezing of February and March. This variety had been in cultivation for four years previous, and had shown no signs of injury, even by the very severe winter of 1874 and '75. It had been very prolific, the mean of the four years yield being $26\frac{1}{2}$ bushels, and many hopes had been entertained that this would prove to be a valuable variety for general cultivation. The past open winter when there was little snow for protection, and when the surface of the ground thawed during the mild days, freezing again at night, for a considerable period, killed nearly all the plants.

It is being tried again the present year.

Clawson. — Weight of seed per bushel $52\frac{2}{3}$ lbs. Harvested July 14th. Weight of straw and grain per acre 3060 lbs. Weight of

grain 1058 lbs. Weight per bushel 51 lbs. Yield 17.6 bushels. Percentage of grain to wt. of straw and grain 34.5.

This variety was injured by thawing and freezing during the winter, and also by rust.

Diehl. — Weight of seed per bushel $57\frac{1}{2}$ lbs. Harvested July 12th. Weight of straw and grain per acre 2490 lbs. Wt. of grain 550 lbs. Wt. per bushel 44 lbs. Yield per acre 9.16 bushels. Percentage of grain to wt. of straw and grain 22.1.

This variety was injured by the winter much less than the Clawson, but was nearly destroyed by rust.

Prussian. — One bushel seed weighed $56\frac{1}{4}$ lbs. Harvested July 14th. Weight of straw and grain per acre 3830 lbs. Wt. of grain 816 lbs. Yield per acre 13.6 bushels. Wt. per bushel $49\frac{1}{2}$ lbs. Injured by rust.

WHITE RYE.

One peck of white rye, received from the Commissioner of Agriculture, was sown Sept. 27th, 1875, upon $26\frac{1}{2}$ square rods of ground. Harvested July 12th, 1876. Yield of grain 385 lbs. Wt. per bushel 57 lbs. This yield is at the rate of $41\frac{1}{4}$ bushels per acre. The grain is quite light colored, much lighter than common rye.

SPRING WHEAT.

The following varieties were sown at the rate of $1\frac{1}{2}$ measured bushels of seed per acre:

Red Mammoth. — Sown April 24th. Wt. of seed per bushel 56 lbs. Harvested July 31st. Wt. of straw and grain per acre 3660 lbs. Wt. of grain 442 lbs. Wt. per bushel 49 lbs. Yield per acre 7.47 bushels. Percentage of grain to wt. of straw and grain 12.

White Michigan. — Sown April 24th. Wt. of seed per bushel 57 lbs. Harvested July 24th. Wt. of straw and grain per acre 5170 lbs. Weight of grain 528 lbs. Wt. per bushel 48 lbs. Yield per acre 8.8 bushels. Percentage of grain to weight of straw and grain 10.2.

Oran. — Sown April 24th. Wt. of seed per bushel 56 lbs. Harvested July 24th. Wt. of straw and grain per acre 5902 lbs. Wt. of grain 230 lbs. Wt. per bushel 46 lbs. Yield per acre 3.8 bushels. Percentage of grain to wt. of straw and grain 3.9.

Odessa. — Sown April 24th. Wt. of seed per bushel 57 lbs. Harvested Aug. 18th. Wt. of straw and grain per acre 3916 lbs.

Wt. of grain 688 lbs. Wt. per bushel 53 lbs. Yield per acre 11.3 bushels. Percentage of grain to wt. of straw and grain 17.6.

German Fife. — Sown April 24th. Wt. of seed per bushel 56 lbs. Harvested July 31st. Wt. of straw and grain per acre 3916 lbs. Wt. of grain 728. Wt. per bushel 56 lbs. Yield per acre 12.1 bushels. Percentage of grain to wt. of straw and grain 18.5.

April. — Wt. of seed per bushel 57 lbs. Sown April 24th. Harvested July 26th. Wt. of straw and grain per acre 4622 lbs. Wt. of grain 660 lbs. Wt. per bushel 49 lbs. Yield per acre 11 bushels. Percentage of grain to wt. of straw and grain 14.2.

Arnautka. — Sown April 24th. Wt. of seed per bushel 58 lbs. Harvested July 24th. Wt. of straw and grain per acre 4038 lbs. Wt. of grain 580 lbs. Wt. per bushel 50 lbs. Yield per acre 9.66 bushels. Percentage of grain to wt. of straw and grain 14.3.

Bismark. — Sown April 24th. Wt. of seed per bushel 55 lbs. Harvested Aug. 3d. Weight of straw and grain per acre 3840 lbs. Wt. of grain 566 lbs. Wt. per bushel 54 lbs. Yield per acre 9.4 bushels. Percentage of grain to wt. of straw and grain 14.7.

Oseca. — Sown April 26th. Wt. of seed per bushel 59 lbs. Harvested July 22d. Wt. of straw and grain per acre 3222 lbs. Wt. of grain 500 lbs. Wt. per bushel 50 lbs. Percentage of grain to wt. of straw and grain 15.5.

Chamberlin. — Sown April 26th. Wt. of seed 62 lbs. per bushel. Harvested July 21st. Wt. of straw and grain per acre 2940 lbs. Wt. of grain 228 lbs. Wt. per bushel 38 lbs. Yield per acre 3.8 bushels. Percentage of grain to wt. of straw and grain 7.7.

All varieties of spring wheat gave promise, until about June 20th, of an excellent yield. The warm rains of the last half of June caused the straw to rust badly, and at the same time the chinch-bugs were working at the roots, so that from both these sources the plants were robbed of the nutriment which otherwise might have yielded a bountiful supply of grain.

BARLEY.

The following four varieties were sown April 27th, with two bushels of seed per acre:

Manshury. — Wt. of seed per bushel 49 lbs. Harvested July 18th. Wt. of straw and grain per acre 5410 lbs. Wt. of grain 2384 lbs. Wt. per bushel 45 lbs. Yield per acre 49.6 bushels. Percentage of grain to wt. of straw and grain 44.

Chevalier.—Wt. of seed per bushel $41\frac{1}{2}$ lbs. Harvested July 19th. Wt. of straw and grain per acre, 3,324 lbs. Wt. of grain, 446 lbs. Wt. per bushel, 33 lbs. Yield per acre, 9.2 bushels. Percentage of grain to wt. of straw and grain, 19.2.

Common Scotch.—Wt. of seed per bushel, $41\frac{1}{4}$ lbs. Harvested July 20th. Wt. of straw and grain per acre, 5,364 lbs. Wt. of grain, 1,420 lbs. Wt. per bushel, 40 lbs. Yield per acre, 29.6 bushels. Percentage of grain to wt. of straw and grain, 26.4.

Saxonian.—Wt. of seed per bushel, $49\frac{1}{2}$ lbs. Harvested July 19th. Wt. of straw and grain per acre, 4,600 lbs. Wt. of grain, 942 lbs. Wt. per bushel, 37 lbs. Yield per acre, 19.6 bushels. Percentage of grain to wt. of straw and grain, 20.4.

This grain, like the spring wheat, made a most excellent early growth, but was injured by rust and chinch bug.

Why the Manshury should have escaped with less injury than the other varieties is not known. The plats were adjacent, and the cultivation was the same in all respects. Yet the difference could be plainly seen before harvest.

OATS.

The following varieties were sown April 29th, with $2\frac{1}{2}$ measured bushels of seed per acre. The early growth of all varieties was rank. The heavy wind and rain of June 11th lodged all but the first varieties so badly that they remained laid until harvest. The filling of the grain, as is shown by its light weight, was thus prevented.

White Schonen.—Wt. of seed per bushel, 34 lbs. Harvested July 26th. Wt. of straw and grain per acre, 5,100 lbs. Wt. of grain, 1,488 lbs. Wt. per bushel, 25 lbs. Yield per acre, 46.5 bushels. Damaged by the chinch bug, and slightly lodged.

Canada.—Wt. of seed per bushel, 35 lbs. Harvested July 22d. Wt. of straw and grain per acre, 3,180 lbs. Wt. of grain, 796 lbs. Wt. per bushel, $22\frac{1}{2}$ lbs. Yield per acre, 24.8 bushels.

Early Fellow.—Wt. of seed per bushel, $36\frac{1}{2}$ lbs. Harvested August 1st. Wt. of straw and grain per acre, 6,152 lbs. Wt. of grain, 774 lbs. Wt. per bushel, $30\frac{1}{2}$ lbs. Yield per acre, 24.2 bushels.

Somerset.—Wt. of seed per bushel, 33 lbs. Harvested July 24th. Wt. of straw and grain per acre, 5,220 lbs. Wt. of grain, 860 lbs. Wt. per bushel, 20 lbs. Yield per acre, 26.9 bushels.

Houghton. — Wt. of seed per bushel, $33\frac{1}{2}$ lbs. Harvested August 1st. Wt. of straw and grain per acre, 4,800 lbs. Wt. of grain, 652 lbs. Wt. per bushel, 24 lbs. Yield per acre, 21 bushels.

Bohemian. — Wt. of seed per bushel, $35\frac{1}{4}$ lbs. Harvested July 22d. Wt. of straw and grain per acre, 2,908 lbs. Wt. of grain, 770 lbs. Wt. per bushel, 32 lbs. Yield per acre, 24 bushels.

CORN.

The following varieties were planted May 25th, on clay loam. The cultivation was the same in all respects, except that the hills of White Australian were $3\frac{1}{2} \times 3$ feet apart, while those of the other varieties were 4×4 feet. The planting was delayed a week on account of the heavy rains of May 17th. The seed did not germinate well, owing to the wet condition of the ground when planted.

White Australian. — Ripe, Sept. 10th. Yield per acre in bushels of 75 lbs. each, 64.1. This variety grew next to wheat, and was after harvest badly injured by the chinch bug. 100 lbs. of ears as drawn from the field gave 76.7 lbs. of grain, and 23.3 lbs. of cob.

Yellow Dent. — Ripe Sept. 20th. Yield per acre in bushels of 75 lbs. each, 73.1. 100 lbs. ears gave 85.3 lbs. grain, and 14.7 lbs. cob.

Early Yellow Dent. — Ripe Sept. 15th. Yield per acre in bushels of 75 lbs. each, 71.1. 100 lbs. ears gave 82.7 lbs. grain, and 17.3 lbs. cob.

Cherokee. — Ripe Sept. 20th. Yield per acre in bushels of 75 lbs. each, 77.

Maryland Yellow. — The seed of this variety was obtained of the Commissioner of Agriculture. Harvested October 9th, but was not fully ripe. Yield per acre in bushels of 75 lbs. each, 75.4. 100 lbs. ears gave 76 lbs. grain and 24 lbs. cob.

The following table contains the yield of these varieties in bushels of ears of 75 lbs. each, since they have been in cultivation upon the University Farm:

Variety.	1871.	1872.	1873.	1874.	1875.	1876.
Early Yellow Dent.....	46.6	52.1	58.6	59.4	53.3	71.1
White Australian.....	72.5	60.7	63.2	59.2*	60.3	*64.1
Cherokee	56.5	51.9	52.7	63.1	51.6	77.0
Yellow Dent.....	.....	.....	49.4	58.4	54.3	73.1
Maryland Yellow.....	.....	.....	.....	.....	.....	75.4

* Injured by chinch bugs.

POTATOES.

The following varieties were planted May 13th, in rows $3\frac{1}{2}$ feet apart, hills 18 inches apart in row. The time of ripening is not given, as the vines were attacked by a fungus growth, about the middle of August, which soon destroyed the vitality of all varieties alike. To this cause I attribute the small yield of the later varieties.

Variety.	Bushels per acre, of 60 lbs. each.
Alpha	106.7
Early Rose....	193.5
Early Favorite.....	140.7
Extra Early Vermont.....	168.4
Snow Flake.....	201
Brownell's Beauty.....	105.5
Compton's Surprise.....	137.7
Peachblow....	58.6
Sutton's Redskin Flour-ball.....	57.3
Eureka	197
Nonsuch.....	168.4
Acme	130.7
Hundred Fold.....	80.7

IMPROVEMENT OF SOILS BY MECHANICAL MEANS.

This experiment was begun in 1871, to be continued five years, upon four adjacent plats of an acre each, which have been cultivated as follows:

Plat 1, to be plowed to a depth of five inches only.

Plat 2, to be plowed twelve inches deep.

Plat 3, to be plowed twenty inches deep by trench-plowing.

Plat 4, to be plowed twenty inches deep by subsoiling.

Plats 1 and 2 have been cultivated in the prescribed manner from the beginning.

Plat 3, in 1871, was plowed twelve inches deep only; in 1872 and 1873, seventeen inches; in 1874 and 1875, eighteen inches, which is as deep as it was found practicable to plow.

Plat 4 was subsoiled sixteen inches deep in 1871; seventeen inches in 1872 and 1873, and eighteen inches in 1874 and 1875.

The cultivation of these plats has been the same in all other respects than those mentioned.

The soil is clay, with heavy clay subsoil; the land is level and

rather low. In the fall of 1873, an underground drain was laid through each of the plats, to carry away water that formerly flowed over them all, after heavy rains.

During the first four years, these plats were in cultivation to corn exclusively. In 1875, a portion was in cultivation to corn and a portion to oats.

The five years through which the experiment was to be continued, expired last year. During the past season these plats have been in cultivation to corn, all of them having been plowed alike, about eight inches deep, except that plat 1 was plowed no deeper than before, in order that no unstirred soil should be brought to the surface. The following table gives the yield per acre for the respective years, the corn being in bushels of ears, weighing 75 lbs. each:

Method of Cultivation.	1871.	1872.	1873.	1874.	1875.		1876.
					Corn.	Oats.	Corn.
Plowed 5 inches deep... ..	55.4	43.5	53.4	53	67.7	60.2	45.7
Plowed 12 inches deep.....	50.6	50.3	52.8	58.1	67	65.5	46.8
Trench-plowed 18 inches deep	44.9	54.7	51.3	65.3	60.5	65.1	43.6
Subsoiled 18 inches deep....	41.2	56.8	51.1	60.8	57.2	64	44.1

In 1875, plats 3 and 4 were quite severely injured by the chinch-bug.

The average yield of corn for the entire six years is as follows:

Plowed 5 inches deep, 63.1 bushels.

Plowed 12 inches deep, 65.2 bushels.

Trench-plowed 18 inches deep, 64.2 bushels.

Subsoiled 18 inches deep, 62.7 bushels.

My thanks are due to Mr. E. G. Hayden, superintendent, for his hearty co-operation in conducting these experiments.

SUMMARY OF METEOROLOGICAL OBSERVATIONS TAKEN AT THE UNIVERSITY OF WISCONSIN
For the Year 1875.

MONTH.	THERMOMETER EXPOSED IN OPEN AIR.				BAROMETER, HEIGHT REDUCED TO 32°				Inches of rain and melted snow.	Amount of cloudiness.	Percentage of saturation.	PERCENTAGE OF WINDS.							
	Max.	Min.	Mean.	Variation.	Max.	Min.	Mean.	Fluctuation.				S.	SW	W.	NW.	N.	NE.	E.	SE
January.....	33	-25	3.6	58	29.439	28.618	29.073	.921	.90	4.8	97	13	17	40	16	2	2	5	5
February.....	27	-21	3.4	48	29.569	28.357	28.955	1.212	2.80	4.3	83	10	16	42	5	11	5	7	4
March.....	64	1	25.1	65	29.291	28.030	28.826	1.261	.90	4.4	70	10	7	31	3	17	15	3	14
April.....	62	11	43.3	51	29.196	28.181	28.882	1.014	1.87	5.1	68	4	22	10	26	7	18	6	7
May.....	83	31	59.0	52	29.443	28.137	26.858	1.306	2.61	4.0	58	12	21	4	13	14	10	10	16
June.....	80	51	64.1	29	29.173	28.564	28.793	.609	3.37	4.8	75	19	13	12	15	9	2	6	24
July.....	86	62	73.0	24	29.238	28.622	28.955	.616	.97	3.8	71	13	19	17	8	8	8	4	23
August.....	86	52	69.6	34	29.140	28.626	28.947	.814	2.57	3.2	71	30	11	0	28	1	16	6	8
September.....	81	36	58.9	45	29.374	28.525	29.009	.849	2.06	5.6	66	25	20	9	17	15	6	0	8
October.....	77	47	46.1	50	29.344	28.380	28.930	.964	1.96	6.3	63	10	32	10	29	10	6	2	1
November.....	54	-11	31.0	65	29.525	28.392	28.987	1.133	.40	.6	81	13	8	13	20	24	2	12	8
December.....	54	-11	31.9	65	29.151	28.044	28.790	1.057	2.18	.7	87	11	14	15	24	9	0	9	18
Sums.....	897	203	509.0	586	352.173	340.627	350.007	11.656	22.59	47.6	890	171	200	183	204	127	90	70	136
Means.....	74½	16%	42.4	48¾	29.347	28.387	29.167	.971	1.87	3.9	74	14	16	15	17	10	7	6	11

For the Year 1876.

January.....	46	-6	24.5	52	29.455	28.103	28.934	1.352	2.31	.4	91	19	29	12	22	2	9	0	7
February.....	51	-12	24.3	63	29.443	28.417	28.934	1.026	1.60	.6	91	23	16	15	20	8	6	5	7
March.....	58	0	27.8	58	29.417	28.064	28.955	1.353	2.27	.6	93	11	8	7	21	21	14	14	4
April.....	66	30	49.4	36	29.336	28.363	28.880	.993	2.65	.5	72	5	22	16	12	5	14	2	24
May.....	83	36	59.5	47	29.321	28.601	28.696	.720	5.18	.4	69	8	33	9	21	3	12	8	13
June.....	87	42	68.2	45	29.065	28.421	28.801	.647	4.57	.6	77	26	28	12	12	1	4	2	15
July.....	89	61	74.5	28	29.187	28.709	28.930	.478	4.14	.4	70	24	12	11	8	19	8	9	9
August.....	90	56	73.1	34	29.189	28.712	28.960	.477	3.42	4.5	72	32	7	16	22	0	3	4	16
September.....	79	36	59.8	43	29.168	28.247	28.835	.921	3.41	4.9	77	0	9	10	21	21	15	20	4
October.....	66	23	45.8	43	29.232	28.40	28.853	.812	1.59	4.4	74	9	31	25	21	5	2	1	6
November.....	56	14	35.6	42	29.351	28.600	28.924	1.750	2.31	.7	82.2	11	11	20	31	22	1	2	2
December.....	41	-22	11.1	63	29.580	28.415	29.064	1.165	.....	.5	86.3	8	16	16	46	7	4	.....	3
Sums.....	812	258	553.6	554	351.746	341.052	347.044	11.694	33.45	18.5	106.3	166	222	162	25	114	92	67	110
Means.....	68	22	46.1	46	29.312	28.421	28.920	.975	2.79	1.5	89	14	19	13	21	9	8	5	9

THIRD ANNUAL REPORT
OF THE
COMMISSIONERS OF FISHERIES
OF THE STATE OF WISCONSIN.

To the Legislature of the State of Wisconsin:

Under the provisions of chapter 307, laws of 1876, there was appropriated to the commissioners the sum of \$10,000, and the commission was reorganized by adding to it Mr. H. F. Dousman as a member, and the governor also, *ex-officio*, a member. The commission was fully organized in April last, and the first meeting was held in Madison on the 6th of April. By the act of 1876, it became the duty of the commissioners to purchase a site for a state hatching house, and to erect thereon a hatching house, tenement, ponds, to equip the hatching house for hatching purposes, and in all practical ways to procure spawns and fish to be disposed of in furtherance of the purposes of the law. The old commissioners, from the balance in their hands of previous appropriations, passed over to the commissioners the sum of \$731.81, and which amount will appear in the financial exhibits hereto annexed, marked B.

After organizing, our first duty was to purchase a site for a hatching house. After a full examination of those offered, the commission, with entire unanimity, selected the grounds known as the "Nine Springs," in the town of Fitchburg, on section 3, and located about three miles southwest from the West Madison depot. The property belonged to a Mr. Crawford, of Kentucky, and was purchased through Gen. W. W. Tredway, his agent, of this city. There is in the tract a fraction less than forty acres, and was procured at \$35 per acre. The deed to the state, after being recorded, was filed with the secretary of state. We claim for this site very superior advantages; in fact, we doubt whether, all things consid-

ered, it can be excelled by any of the states provided with commissioners. The number of springs, the fall, and their close proximity to each other, are all that we could desire. There is an abundance of water, pure and cold, and the fall in some of them, upwards of twenty feet, is such that there is no danger from surface or back-water. That part of the tract which lies below the springs is marshy, and contains eight or ten acres. The residue is timbered, and will furnish fuel for the hatching house for many years to come. The upland, when properly cleaned of underbrush, will make a fine park of eighteen or twenty acres. We did not require the quantity of land purchased, but were compelled to take the tract we did in order to secure the springs. A view of the premises will, we think, satisfy the legislature that the purchase was made in the interest of the state, and at a surprisingly low figure. Private parties would gladly have taken the purchase at a much higher figure than that paid by the state, and to be used for the purpose of fish culture. Its adaptation to such purposes is all that we could ask.

As soon as the site was purchased, we at once let the contract for the erecting of the hatching and tenement houses. In the mean time, we constructed a barn; this being necessary to give to the men shelter while performing the other work, and for subsequent use by the superintendent. The buildings authorized by law have been completed and paid for under the contract. We feel authorized in saying that all the work done, including the fencing, as well as the fitting of the hatching house, has been done as well and economically as the same could have been done by a private person. We give the dimensions of the various structures:

The tenement house is 20 x 30 feet, with a wing 18 x 22; the hatching house is 25 x 40 feet, and the barn 16 x 24, and with surroundings, is convenient for the superintendent's purposes. The hatching house is located on a fine spring, with two ponds above it. It has a stone foundation, and the reservoir from which the water is admitted into the hatching troughs is about five feet above the floor. It is well and compactly built, painted outside, and is fitted up with a reservoir, and has now ten troughs. If desired, these can be increased. The buildings are constructed of good, seasoned timber.

We invite a careful examination of all that we have done in the

matter of purchasing a site, and in the cost of construction of buildings, and their adaptation to the purposes designed. There was some diversity of opinion on the board as to our power to procure the spawn of the white fish and lake trout, and hatch them outside of the hatching house at Madison. This question was referred to the attorney general, and his opinion thereon was communicated to the commissioners in writing. That opinion warranted the commissioners in establishing a temporary hatching house at the city of Milwaukee, for the hatching of spawn of the white fish and lake trout. The common council and the board of public works of that city, with great liberality, placed at our disposal adequate space in their water works building for that purpose, with permission to draw all the water required for hatching purposes, from their reservoirs. As the white fish cannot be fed in artificial ponds, like the trout, salmon, and other food fishes soon after being hatched, they must be placed in waters adapted to their growth. The propagation of the white fish must always constitute the leading object of the commission, and the stocking of Lake Superior, Lake Michigan and Green Bay, must be kept steadily in view. The hatching house at Madison is designed exclusively for stocking our inland lakes, rivers and streams, with the varieties of fish suited to their waters.

OPERATIONS OF 1876.

After the construction of the buildings hereinbefore named, at the Madison Hatchery, and the erection of ponds (seven in number), Mr. M. D. Comstock, a practical pisciculturist, late of Columbia county, Wisconsin, was chosen superintendent. His salary is fixed by law at \$1,000 per annum, and a tenement furnished in addition. He has given the bond required by the law, and entered upon his trust on the first day of September last. Under his immediate supervision the ponds named were constructed, and the troughs placed in the hatching house.

The grounds and springs will admit of the construction of at least twenty-five additional ponds. All these may never be required. The capacity of the hatching house is 1,000,000 of the eggs of the salmon, of the speckled trout double that number. In October, Mr. Comstock placed in the troughs 86,000 of the California salmon ova, in fine condition. The success attending this first trial was complete. Upwards of 90 per cent. were hatched, the fry be-

ing exceedingly strong and healthy. The eggs were sent by express from Sacramento, California, and were taken from the McCloud river, a tributary of the Sacramento river, under the direction of the United States commissioners. When full grown they vary in weight from fifteen to twenty pounds, and have been taken weighing sixty pounds. The only expense attending the ova was the express charge — that being equitably apportioned among the several states provided with commissioners and desiring the spawns. The United States establishment, located at Reservation, Redding, California, annually distributes millions of the spawn of the salmon, as above stated. The action of the government in this respect is a great aid to the states in the matter of fish propagation.

There have been placed in the ponds, from the establishment of Messrs. Mann & Dousman, of Waterville, Waukesha county, and where they were bred, 2,000 speckled trout, over two years old. Their average weight is about one-half pound each. They were received in excellent condition, and are designed for breeders. Over 100,000 of the eggs have been secured from them since they were placed in the ponds, and the eggs, at this writing are in process of being hatched. Six hundred California salmon, about a year old, were placed in the ponds from Mr. Palmer's establishment; from the same source, also, 1,000 Penobscot salmon, and 2,000 of the land-Locked. If these last named varieties thrive, we purpose to keep them as breeders. With our facilities for water and ponds, we hope, in a few years, to be able to take on the ground all the spawn we may desire for the hatchery at Madison.

We need scarcely add, that at this establishment we have all the appliances we could desire for fish culture. Without wishing to overestimate our advantages, and again referring to our site, we think, all things considered, that we have a very superior situation for our purposes, and one of the very best of hatching houses. The Madison lakes are among the finest bodies of inland waters in the northwest. The springs upon which we are located, empty their waters into a large bay lying north of Waubesa or Second Lake, and with this bay, the entire chain of lakes of the four lake country is connected. From the hatching house springs and without ever taking the fry from the ponds in which they are bred, we can stock nearly 21,000 acres of water. Being equi-distant between Lake Michigan and the Mississippi, with the railroad facili-

ties at hand, we can easily reach all the settled parts of the state and find ready access to our inland streams and rivers and almost numberless lakes. For the most part, these streams and lakes are adapted to the habits and wants of great varieties of food fish, and when properly stocked, in connection with the other inland waters of the state, must materially increase the food resources of our people with a most healthful article of diet.

AT MILWAUKEE

we have placed in working order twenty of the Hatton hatching boxes, with a hatching capacity of 10,000,000 white fish eggs, and we now have in them in process of hatching, upwards of 7,000,000 of the white fish spawn. There are also twenty-four troughs, twelve inches wide and sixteen feet long, with a hatching capacity for nearly 4,000,000 salmon trout spawn. We have now in these troughs nearly 2,000,000 of the eggs of the trout. The spawn of the white fish was taken at Detroit river, Escanaba, and Sangaton, and those of the trout at Milwaukee. By combining with other parties, we were enabled to greatly facilitate and forward our labor. The following named gentlemen co-operated with the commission in the taking of salmon trout eggs, and secured the number named:

N. K. Fairbank, for Green Lake	600,000
B. T. Shaw, for state of Iowa.....	900,000
G. H. Jerome, for state of Michigan.....	1,000,000
Seth Green, for the state of New York.....	500,000

It afforded us great pleasure as well as profit, in being brought in contact with these gentlemen, all of whom are skilled and enthusiastic in the matter of fish propagation. Mr. Fairbank, of Chicago, has devoted much time and money in encouraging fish culture within this state, and is proprietor of a private hatching house at Geneva; Mr. Shaw is fish commissioner of Iowa; Mr. Jerome is superintendent of fisheries of Michigan, and by long experience and close observation, has attained a national reputation as a successful breeder of fish. His labors are invaluable to Michigan, that being a state unrivaled in the Union for the extent of her waters, and to which, among our inland states, Wisconsin is only second. Of Hon. Seth Green we need not speak, his great labors and unparalleled success in fish culture having given him an enviable reputa-

tion among the fish breeders of Europe as well as in this country. In short, our correspondence with the commissioners of the eighteen states provided with commissioners, has been of an agreeable and profitable character, and in the interchange of annual reports we obtain much useful information.

A plan for the distribution of fry will soon be matured. We shall deal justly with every part of the state. We have gathered all the information we could without incurring expense, in regard to inland rivers, streams and lakes.* It must be borne in mind that we have just entered upon our work. Until the appropriation of last winter, we have been powerless to answer the wants of the people. Numerous and urgent applications are constantly being made for fry. These we have not been able to meet except in a very limited manner. With our facilities in the matter of ponds in which the fry can be kept until the fish attain age and size, the question as to the best time in which to distribute them will be considered. If, from the habit of being fed, the fish, when placed beyond control, fail to seek their own food, then they should be placed in the water before the entire absorption of the sack with which nature has furnished them. If they can be kept in ponds until they are large enough to escape the enemies which feed upon the young, and at the same time hunt their own food, a great point will be gained. A few thousand thus advanced in size will, if they can obtain their own support, much sooner replenish barren waters by a natural increase of their kind, aided by annual contributions from our ponds.

In the distribution of the fry of the speckled trout, and which is confined to local streams, we have adopted the rule that in all such cases, the owners of the land through which such streams run must, in order to obtain them, give a written permit to the public to allow the trout to be taken, subject to the fish laws of the state. This precaution will remove all causes of complaint on the score of partiality. Of this variety of fish, we hope to have large numbers for the season of 1877.

Last winter, under the direction of the then Commissioners, the fish laws were codified and laid before the legislature for action. In its discussion in the senate, such a variety of conflicting local interests were brought forward, that the bill was defeated. The number of acts of the legislature on the subject, together with the power

conferred upon counties to regulate the taking of fish, makes it difficult to know what the law is. Our action being a mere codification of existing laws, should have received the sanction of the legislature. We did, however, provide the bill for repealing the law authorizing boards of supervisors of counties to make rules on the subject. We hope this winter to secure a better understanding on this matter, in order that laws intended for the protection of fish may be more generally understood, and more efficiently enforced. Additional legislation may be needed.

We have not designed, in this report, to enter into a discussion as to the feasibility of fish-culture, regarding that question as completely settled in the affirmative. The operations in Europe, Canada, and the United States, have been attended with complete success. The number of public and private establishments is large. In our own state many private parties have opened ponds, and the number is increasing rapidly. It is our purpose to aid, so far as we can, all these enterprises — being careful not to use the funds of the state for mere individual benefit. As the general government donates spawn largely to the states, so we, in turn, so soon as our facilities are perfected, shall be glad to extend aid to private enterprises in furnishing spawn of fishes at prime cost.

STATE BOARD OF HEALTH.

Extracts from their first annual report, also papers by Solon Marks, M. D., of Milwaukee, on Sewerage and Drainage, Gen. James Bintliff, of Janesville, on Ventilation of Public Buildings and Dwellings, John Favill, M.D., of Madison, on Mental Hygiene, and O. G. Selden, M. D., of Tomah, on Foods and Domestic Beverages.

STATE OF WISCONSIN,
OFFICE OF STATE BOARD OF HEALTH,
January 10, 1877.

To the Honorable, the Legislature of the State of Wisconsin:

In accordance with the provisions of the law under which the State Board of Health has been organized, its first annual report is herewith presented.

The progressive spirit of the present era manifests itself in no direction more beneficently than in its efforts for the prevention of disease and of premature death. Indeed one of the most marked characteristics of this age is the advanced estimate which it places on the value of human life and the care which is taken for its preservation. Under improved sanitary conditions and surroundings, the plagues and pestilences which once swept the earth have mostly ceased to exist, and statistics of longevity establish the fact that the average duration of man's life has been materially lengthened.

Doubtless, a part of this bettered condition of mankind is due to the increased comforts that have accompanied the advance of civilization, but in a much larger measure it is due to the better observance of sanitary laws by individuals and by communities — to individual and to public hygiene. It has been chiefly left to this age to extend a knowledge of these laws to the people, to urge, and in some cases to enforce, an obedience to them, and so wonderful have

been the resulting benefits, that we may be truly said to have entered upon "a new era in medicine" — "its highest and most beneficent development." Men have learned, and are learning, the grand fact which is the underlying principle in all sanitary labor, that "disease and death are in a great degree preventable." It is upon this foundation that the rapidly multiplying Boards of Health and Public Health Associations are builded. It is the effort of the physician to cure, if possible, individual cases of disease. It is the labor of the sanitarian to prevent the very inception of disease. In this, his is the higher work, and it is also one which gives greater promise. Dealing largely with communities and with the influences affecting bodies of men in these efforts, their importance rises beyond that which seeks alone to cure the disease of the individual, and *preventive medicine* assumes a rank beyond the curative.

In all these labors for the physical good of man, it is not to be forgotten that other good is at the same time accomplished for "the same causes which promote physical disease and favor preventable mortality, foster also immorality, degradation and social misery. Uninhabitable habitations, over-crowded rooms, foul air, neglect of personal and public cleanliness, insufficient sanitary appliances, intemperance, uncontrolled habits of impurity; these are not only the factors of disease but they are also the factors of moral degradation." To eradicate these causes of disease and death is therefore to elevate man both morally and intellectually, and to assist in his restoration to the likeness of his Maker.

It is not needful here to recapitulate what has been accomplished by State Health Boards since they were first organized in this country in the state of Massachusetts. It would be easy to show that they have proven here, as in England and elsewhere, of real and practical benefit — conservators of their best physical interests, and a real blessing to the people of the several states where they are in operation. This has been so manifest indeed, that though less than eight years have elapsed since the inauguration of this movement in this country, ten states have already adopted and put into practical operation the idea of STATE MEDICINE, which number will doubtless be considerably increased during the present winter. We believe that it would be easy to demonstrate the wisdom of these organizations, not alone on the score of humanity, but also on the score of the truest economy, for while there is "nothing so

costly as sickness," neither is there anything which so much contributes either to the happiness or to the wealth of a state, as the health of its citizens. That "public health is public wealth has become a part of the inner consciousness of the people." It is not a hasty or unconsidered statement that we make when we assert that the pecuniary loss to a state from *preventable sickness*, annually exceeds its entire cost of government; yet to build an argument in favor of an organization of this character, upon the cost of preventable sickness in *money*, is to build it upon the lowest and most unworthy ground. If by its investigations into the causes of disease, and its timely words of advice or of warning, it shall be able to save the life of a single citizen, then might a state consider itself repaid for the cost of its Health Board, and humanity might well demand this at its hands. Victories over disease are grand victories, and in the language of Dr. Baker, to those "who shall call forth and so marshal facts and generalize the scattered forces of knowledge as to lead to victory over any one of the causes of disease which now annually destroy our citizens by hundreds or by thousands, humanity may well accord a higher praise than to the most successful of warlike generals."

To enlighten the people concerning such causes; to instruct them that they may escape sickness and death from preventable diseases; to teach them "a better knowledge and observance of hygienic laws," is the legitimate work of a State Board of Health, and is included in the comprehensive term "State Medicine," which, with Dr. Bowditch, we understand to be "special function of state authority by which it is bound to take care of the public health, to investigate the causes of epidemic and of other diseases, in order that each citizen may not only have as long a life as nature would give him, but likewise as healthy a life as possible." Certainly "these objects rank among the most important matters discussed by the humanest hearts," and none "can be nobler or more deserving the attention of learned men, of philanthropists, or of statesmen."

"The primary object of public medicine," says Dr. Farr, "is to prevent disease; but it also surrounds the sick with conditions most favorable to recovery, and diminishes the death-roll of the people." And the same eminent authority, recognizing the difficulties that environ this labor, says: "Supposing every condition favorable

for the most perfect operation of the powers of state medicine, we should still see grave defects in many persons; shortcomings in others; in many, organic degeneracies; in many, criminal depravities." And he gives, as the closing thought of an able address: "How, out of the existing seed, to raise races of men to divine perfection is the final problem of public medicine."

Accepting these exalted views of state medicine, and of the duties of a State Board of Health, the undersigned have entered upon the duties imposed upon them by the commission of his excellency, the governor, with a feeling of individual responsibility in view of the greatness of the work before them; with an earnest desire so to meet the varied duties and difficulties which will confront them as that their work will commend itself to the intelligent judgment of the people; and with the hope that they may so inaugurate this new and important department of public service, as to demonstrate its capacity for a usefulness which shall not be limited to the present time, but which will increase with the passage of years, and prove to be a blessing to the people of the state, lasting through all time.

In presenting this first annual report, the board beg leave to say that they regard the work thus far done as largely of a preparatory nature. The time which has elapsed since its organization is much too limited for it to hope for the exhibition of any great results, yet they believe that some good preliminary work has been done, and that there has been awakened in the minds of many of the people a thoughtful interest in sanitary matters, which cannot fail to be productive of future good. It has been the object of the board to enlist the interest and co-operation of thinking men, both within and without the medical profession. It has been its belief that thus they could best create and develop a public sentiment in favor of hygienic principles and practices. It is painfully evident that this must of necessity be a comparatively slow work — that a large majority of our fellow citizens are both ignorant and careless as regards many of the fundamental principles of hygiene, and that they live in daily and direct disobedience of many of the simplest laws of their physical being.

For the purpose of systematizing the labors of the board, and of bringing before the people such useful knowledge as is contemplated by the law, each member of the board has been charged

with the special study of some branch of sanitary science, with the view of presenting the result of such investigations to the people. We present herewith the fruit of such labor in a series of papers, which are designed to convey such knowledge in a popular, rather than in a scientific manner, which papers we commend to your attention.

SMALL POX AND ITS PROPHYLAXIS.

Of the reports herewith given, that of Dr. Griffin, on small pox, will possess special interest from the fact that this disease has been, and now is, unusually prevalent and fatal in various places in the state. We commend its teachings to careful study. Small pox may be pointed to as at once the most amenable of all diseases to prevention, and the most destructive of all diseases when unmodified. Capable, as we believe, of being *utterly exterminated*, it has lost none of its virulence since the time when, during the single century preceding the discovery of vaccination, it caused the death of 45,000,000 of human beings on the continent of Europe. In the metropolis of this state, during the last half of the year just closed, it caused the death of 162 persons, the mortality in one ward reaching, in the month of November, the frightful figures of $58\frac{1}{2}$ per cent. of all cases. As might have been anticipated the health officer reports that the disease has prevailed almost wholly among those who *oppose* vaccination. We believe that properly applied and enforced, preventive measures might have saved these 162 lives, and the hundreds of other cases of sickness from this loathsome disease which occurred during the same period of time, with all their attendant burthens of woe, of sorrow, of interrupted labor and business, and of enormous expense, but such results can be accomplished only by aid of stringent laws making vaccination and revaccination compulsory. We believe that public opinion and a due regard on the part of the government for the welfare of the people, will in time demand this; but this board is not now prepared to do more than call your attention to these facts, and to state that in its judgment, based both upon personal observation and extensive correspondence on the subject, much less than one-half of the population of the state are now protected against this dire scourge.

This subject has been deemed of sufficient importance in view of the prevalence of the disease, to call for the issue of a special cir-

cular of warning and instruction, which has been widely published in the newspapers of the state, and to some extent distributed to physicians.

SEWERAGE AND DRAINAGE.

The report of Dr. Marks on sewerage and drainage, touches a subject of vital importance to every community. The influence of drainage upon health is, at the present time, attracting very great attention among sanitarians, and it is clearly demonstrable that as the drainage of a district is perfect or imperfect, so certain forms of disease disappear or prevail. No water-soaked ground can ever be healthy, or fit for human habitation. Soil moisture is well known to be one of the prolific causes of the tubercular diseases which annually claim tens of thousands of victims. Dwellings, otherwise excellent, are often erected in apparent utter thoughtlessness of the character of the soil on which they are built, or its capacity for drainage, where this should have been a primary consideration, and thus not infrequently there is laid, not only the foundation of a dwelling, but at the same time the foundation of a fever, or a consumption. Imperfect sewerage, where a system is established, is also a fruitful cause of disease. The escape of sewerage matter into our water supplies, or the subtle emanations of sewer gas into our dwellings are deadly poisons which sap the citadels of life without warning. The subject is a wide and a practical one.

CONSTRUCTION AND VENTILATION OF PUBLIC BUILDINGS.

Somewhat closely connected with the subject of sewerage and drainage is that of the construction and ventilation of public buildings, upon which a preliminary report is made by Gen. Bintliff. This is also an extensive field for sanitary study intimately concerning us all; for however carefully we may construct our own dwellings, none of us can escape the evil influences connected with the construction and ventilation of public buildings. This report touches more particularly upon the construction and ventilation of the school buildings in which so large a portion of the time of our children is spent, pointing out some radical defects which exist in them, and which lie at the foundation of not a few of the diseases which tend to produce a race of invalids. While there are admitted difficulties attending the securing of a satisfactory system of ventilation, it is yet evident to every thoughtful observer that very

many of the existing defects might be avoided, and that in the construction of our lofty school houses and in the general custom of sending to the uppermost rooms the advanced classes of girls who are just developing into womanhood, there is being practiced an evil against which there cannot be uttered too emphatic a remonstrance. We fully indorse and cordially recommend to school officers and school architects the idea of lower school buildings, with greater floor space to each scholar, and believe that all questions of architectural beauty should be made subordinate to the higher consideration of the health of our offspring.

MENTAL HYGIENE.

The subject of mental hygiene, treated by Dr. Favill, is one upon which comparatively little has been written, yet one of very great interest and importance. How rightly to train and feed the expanding minds of our children, is a problem worthy our most careful attention; when, where and how to teach them so as to develop their mental health and strength, is a question upon which their future welfare in a great measure depends. The effects of popular methods of school education, the pernicious influence of self-reporting, and of prize systems, the demand of developed mental activity for food, the effect of bodily fatigue on the mind, and the influence of heridity, are some of the topics treated of in this paper. We call especial attention to the thought of the writer that insanity is generally a consequence of *disuse* rather than of *overuse* of the brain, and that the occupations calling for most mental strength are the least likely to break down or to lead to insanity.

FOODS AND DOMESTIC BEVERAGES.

The paper of Dr. Selden, on "Foods," is the opening of a wide subject of practical daily application. The kinds of food, the methods of preparation, the time and manner of eating, the influence of certain kinds of food on the system, the reasons why certain articles of food can be used continuously, while the relish for others is speedily lost, the absolute necessity for a certain variety of food, the necessity for changing our hasty habits of eating, and of more thoroughly masticating our food, are among the things treated of in this paper on this most fruitful theme. There can be no question but that, as a people, we are in need to be constantly remind-

ed of our "sins against the stomach," and that our food is to a great extent improperly selected, imperfectly prepared, and in general far too hastily, and often too frequently eaten.

REGISTRATION.

We commend to your consideration the paper which has been kindly prepared, at our request, by Dr. Joseph Hobbins, of Madison, in which is set forth some of the more prominent advantages of a registration of vital statistics. This subject is one which has engaged much of the thought of this board, and effort is being made to give vitality to the existing law on this subject, which, though it has held a place on the statute books for many years, has been, so far as the recording of births and deaths is concerned, in most places practically a dead letter, and, for all purposes of sanitary study, absolutely valueless. This is evident from the fact that *two-thirds* of the counties make no return whatever of deaths, and more than one-half make no returns whatever of births. Marriages are reported more or less perfectly in every county of the state, with one exception.

Without registration we can know nothing accurately concerning the birth or death rate, or the amount or character of prevailing diseases. Believing, as we do, that Wisconsin ranks among the most healthy states of the Union, our registration has been so imperfect that we have no figures to substantiate our belief, outside of the city of Milwaukee, which, "according to a table compiled by the health officer of the city of Brooklyn, in 1875, shows a smaller ratio of total mortality than any other city of its size in this country." It is eminently desirable that every state and every community should not only know, but exhibit its vital statistics, and that the healthfulness of locality should be largely a determining element regarding residence therein. From such an exhibit we believe that Wisconsin could not fail to be the gainer by emigration to it. Thus a tabular statement in the last report of the Board of Health, compiled by the health officer of Brooklyn, showed the death rate from consumption in twenty-seven American cities, and places Milwaukee lowest in the list, with one exception; and from the same report we learn that, of sixty-two American cities, Milwaukee stands ninth, and, compared with fifty-seven foreign cities, it ranks fourth in low annual death rate. Should we exclude

the infant mortality, which has been very high, Milwaukee would at once rank as among the healthiest cities in the world, and there can, we think, be no reasonable doubt but that the state at large could make an exhibit equally, if not more favorable.

In conclusion, we congratulate the people of the state upon the enlightened wisdom of her legislature, which by the inauguration of state medicine, has shown this appreciative care of the highest interests of her citizens and placed herself abreast with the most advanced humanitarians.

We beg leave also to say that as the main object to be accomplished by the publication of the annual reports of this board is the dissemination of the information they may contain among the people, for their education in matters pertaining to their health, such object may be largely defeated by the fact that the very limited number of copies of such reports placed at our disposal by existing laws, will prevent such liberal distribution of the same as we believe this object demands.

Very respectfully,

E. L. GRIFFIN, JAMES BINTLIFF,
JOHN FAVILL, J. T. REEVE,
SOLON MARKS, H. P. STRONG,
O. G. SELDEN.

DR. GRIFFIN'S ADDRESS.

Gentlemen:—Acting under instructions from our worthy governor, we have met at this time to perfect our organization and enter at once upon the special work committed to this board.

I shall not go amiss in your judgment, I think, if I briefly call your attention to some of the objects of the field of study and labor upon which we are now about to enter; for upon our right appreciation of the position we now take, and the duties growing out of that position, and our fidelity to those duties, will depend the usefulness of this organization to the state. We can hardly overestimate the importance of the work to which we now personally commit ourselves.

Through the enlightened judgment and liberal action of our

legislature, Wisconsin has inaugurated a movement that may be made capable of good to her citizens in all future time. No statute of the state embodies greater wisdom or touches a more vital interest of the people than the one under which we act. Impressed with the essential dignity of the offices we hold, while we distrust our own fitness for the work, I trust we shall be loyal to the truth and act wisely under the responsibilities which the law imposes.

It is a matter worthy of note that Wisconsin, comparatively a young state, has so early in the history of the study of "*State Medicine*," planted herself by the side of other states which have, by legal enactments, created State Boards of Health.

In June, 1869, Massachusetts, through the judicious and philanthropic efforts of a few good and true men, was the first to pass a law establishing a State Board of Health. The elaborate reports given to the state by the learned gentlemen who have served upon that board, upon various subjects vitally connected with the health and the lives of the citizens of the state, have greatly quickened thought and stimulated inquiry in every state of the Union, and in foreign countries, upon the great question of public hygiene.

In 1870, California, following the example of Massachusetts, established a State Board, which, by their faithful work and intelligent advice, have rendered important service to the state.

In 1872, Minnesota entered upon the same beneficent work. The able papers of Drs. Staples and Sempler, just given to the public in their Fourth Annual Report, on the advantages of the climate of Minnesota to consumptives, are worth to the state many times the amount of the appropriation for the support of the board.

In 1873, Michigan committed this work to some of her ablest and most philanthropic men. Their labors in the field of "*Preventative Medicine*" have already awakened a general interest and inquiry among the citizens of the state, and led to such observance of hygienic measures as already to demonstrably diminish the death rate throughout the state.

Pennsylvania has agitated the subject, and a bill creating a State Board, with the liberal appropriation of \$8,000 was defeated by a small majority at the last session of her legislature. The medical profession in Indiana has also entrusted the work to a committee who are already at work creating a public interest in the measure.

When the law under which we now work was published, March

31, 1876, Wisconsin was the tenth state which had committed herself to this wise and humane service. Since that date the territory of Colorado has organized a board, consisting of ten of her ablest men. We may safely predict that the day is not far distant when every state in the Union, in obedience to that advanced public sentiment which will regard *public sanitation* as the grandest and best gift a government can confer upon its citizens, will have a similar organization, working under laws so uniform as to secure great harmony and efficiency of action throughout the whole country.

I mention these facts to remind you that, although the field of labor into which we now enter is comparatively new, yet it is not entirely uncultivated. The labors and investigations of these various boards have brought out facts and suggestions that will be of the utmost importance to us in our work. The work in all the states, is essentially the same. If wisely performed, it will be far reaching in its results.

The second section of the law creating this board indicates somewhat clearly, in general, the work we are to perform. An essential part of this work specifically, and as it grows out of special investigations of specific subjects, is to *educate the people of the state into a better knowledge of the nature and causes of disease, and a better knowledge and observance of hygienic laws*. These laws are to be taught and in all practical ways enforced. The necessity of this work will be apparent when we reflect that a great majority of the physicians of the state — a class of persons who, by virtue of their office, are the conservators of the public health — have as yet given but little thought to the subject of preventive medicine, but accustom themselves to look upon the office and function of the physician as merely to recognize and cure disease.

Comparatively little instruction is given in the science of hygiene in our common schools or the higher institutions of learning in the state. There is need that it should form an essential part of the required study so soon as the pupil is of age to profit by such study; for a majority of such pupils, by necessity, leave school early, and are members of families to whom a knowledge of practical hygiene is very essential.

As “the sanitary care of its citizens is the first duty of the state,” there should be established in our university, our colleges and nor-

mal schools, a professorship of physiology and practical hygiene, and no pupil should be considered qualified to go forth and teach who was not only well instructed in the "facts, principles and dictates of sanitary science, but had also a proper appreciation of their value." The people need *facts* — facts fortified and made cogent by figures; facts demonstratable from persistent and ever active causes, and gathered from many localities. They need to be taught that *consumption* has its cause often in *soil moisture*; that the external cause of typhoid fever is an animal poison introduced into the system through infected water, or foul gases emanating from decaying animal matter, and that the death of their dear ones, so often resignedly attributed to Divine Providence, is the result of their own sin of neglect; the legitimate outcome of a neglected privy; an open cesspool; a disgusting pigsty; a contaminated well or a festering ground surface near the dwelling, which has been drinking in the kitchen slops for years, foul gases from which have been forced by moving currents of air into and through all the apartments of the home.

Another part of the duty of this board, indicated by the law, is the "study of the vital statistics of the state, with a view to making intelligent and profitable use of the collected records of sickness and death among the people."

The successful study of sanitary science must always be based upon mortuary facts. These can only be obtained by aid of legal enactments which shall be compulsory to a degree that shall secure the necessary care and labor.

An intelligent author says: "One of the first great objects of sanitary organization is to watch the death rate — to watch it not only over a city or parish, but in detail; to watch it in regard to difference of sex, age and circumstances; to watch it from month to month, and even from week to week; to watch it as affected by different diseases, and particularly what are termed epidemic diseases, and such diseases as are believed to be preventable, and this done, to make known from time to time the results to those who are chiefly concerned in sanitary evils, so as to effectually bring home to the dwellers in darkness, ignorance and disease, the immense significance of the facts taught by these figures."

It is evident this cannot be done without complete and accurate returns of mortuary facts from all parts of the state. Hence a pri-

mary duty will devolve upon this board, to carefully study defects of our registration laws with the view of such modification as may be necessary to secure intelligent and full registration returns from every town and city in the state.

It is further made the duty of this board to make sanitary investigations and inquiries respecting the causes of disease, and especially of epidemics; the causes of mortality, and the effects of localities, employments, conditions, ingesta, habits and circumstances on the health of the people." These themes are suggestive, stimulating, grand.

Let the public mind become enlightened as to the *nature* and *causation* of diseases, and the means of their prevention, and let there be a corresponding thoughtfulness and care in the observance of preventive measures, and not only will the death rate throughout the state be materially lessened, but it will be demonstrated to every observing mind that *sanitary and economic science* are inseparable in a wise administration of civil government.

On the very threshold of the second century of our national life, Wisconsin inaugurates this movement — a movement which, in its *scope and aim*, is likely to be one of the grandest and most beneficent of any that shall command the thought and engage the services of the physician and philanthropist, as the decades of this century pass, not only in this state, but every state of the Union and on every continent.

To us is given the honor, and upon us rests the responsibility of the initiatory work of the state. It is for us to make the work of this board "*popular with, because useful to, the people of the state.*"

CIRCULAR No. 2.

OFFICE OF THE STATE BOARD OF HEALTH,
APPLETON, Wisconsin, August, 1876.

DEAR SIR: This board is desirous of securing information in reference to such diseases as may be prevalent in different parts of the state, and for use, if desirable, in the first annual report of the board. In selecting you as one of its correspondents, it is hoped that you will have the kindness to answer the following inquiries:

1. Has there been in your locality a notable increase or decrease either of sickness or of death, from all causes, for the year ending September 1, 1876, as compared with previous years?

2. Have any diseases been especially prevalent in your locality during the past year?

3. If so, please name such diseases, in the order of their prevalence, stating the type of each, whether mild or severe?

4. Can you discover any causes for the prevalence of these diseases?

5. If you can, do you believe that such causes are in any degree preventable or removable? And if so, how?

6. Have any diseases been attended with unusual fatality? If so, name them, and give your opinion of the cause of this fatality.

7. Please give, as near as possible, the number of cases of any endemic, epidemic or contagious diseases, and especially state whether there have been any cases of small pox. How many? Had these cases been previously vaccinated? What was the result, death or recovery?

8. Give your opinion as to the proportion of the inhabitants of the locality included in your report, who are thoroughly protected against an attack of small pox by vaccination and revaccination ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$)?

9. Can you suggest any method of improving the general sanitary condition of your locality?

10. Please state what diseases, if any, have been prevalent among animals, and to what extent?

11. Have you a local health officer and an organized health board which takes cognizance of local causes of disease? If so, please give name and address of health officer.

12. Please state, as accurately as possible, what diseases are prevailing at the date of making your report, and what their type.

Please define the locality for which your report is made, its most prominent features, and the number, proportion of foreign population, and general occupation of its inhabitants, with such other information concerning it as you may be able to give.

You are particularly and earnestly requested, *whenever* any contagious disease, or disease of severe and fatal type, shall appear in your locality, to report such fact at once to this office, with all possible items of interest therewith connected.

The board, while desiring explicit answers to the above questions, will, if you are unable to give such answers positively, be glad of your opinion (stated as such) on any of the questions, and any additional information you may be pleased to give, concerning sources or removable causes of disease, will be thankfully received and used with discretion, and the name of the writer and locality referred to omitted from our report, if so requested.

In your reply to these questions, it will not be necessary to repeat them, but simply refer to them by number.

Please let your report be understood to cover the year ending September 1, 1876, and all replies should be mailed to this office (in inclosed stamped envelope) by September 20th.

By direction of the Wisconsin State Board of Health.

Very respectfully,

J. T. REEVE, M. D.,

Secretary.

Circular number two, a special circular of inquiry, was issued in the month of August, and sent to something more than two hundred physicians, embracing nearly every county in the state. Replies have been received from fifty-seven physicians, to all of whom the thanks of the board are due. These replies cover more than half the counties, and from them there has been obtained much information concerning the general health of the state, and many valuable suggestions concerning removable or preventable causes of disease. It is particularly gratifying to note the cordial manner in which the objects of the board are commended, and the assurances of active co-operation with it. Many of these letters speak of the desirability of establishing local boards of health — boards which shall have not only a legal existence, but which shall have vitality, and be efficient co-workers with this board, in the effort to secure for every man and every locality the best sanitary surroundings which it is possible for it to attain. While it is true that responses were received from less than one-third of those addressed, I regard this experience as justifying the belief that an ample and energetic corps of correspondents can be secured. An analysis of these papers shows that, while there have been extensive epidemics of small pox, scarlet fever, measles, whooping cough and diptheria, yet there has, on the whole, been a very general decrease of sickness and of death, as compared with former years.

The entire correspondence, which is in possession of the board,

gives much material for profitable study, and contributes materially to our knowledge of the sanitary condition of the state. But it may not be amiss here more particularly to call your attention, by short extracts from a few of these reports, to the opinions of these correspondents concerning the need of, and benefits which may result from, sanitary improvements:

Boscobel.—The sanitary condition of this locality might be improved by thoroughly policing the streets and alleys, caring for drains and cesspools, and suppressing the sale of unwholesome food, such as unripe and decayed vegetables.

Oconto.—Sanitary condition improvable by a system of sewerage, of which there is none. Dwelling houses are low, badly ventilated and overcrowded, and inhabitants suffer from diseases resulting from such causes of filth.

Beloit.—Typhoid fever and dysentery of severe type have prevailed here. Believe it to be from low state of water in streams and ponds, and preventable by regulating use of water at dams.

Green Bay.—The sewerage of this city is bad — there is almost none. Most of the city is built on flat land, which has a surface of alluvium, varying from two to ten feet, and a substratum of clay from eighty to one hundred feet in depth. This alluvium is rapidly becoming saturated with filth, when the city will experience the dire effects of sanitary neglect.

Milwaukee.—The sanitary condition of this place can be made better by improving our systems of sewerage. At this time most of the sewers in the city discharge their contents into an almost currentless stream, converting it into a cesspool from which large quantities of malarial poison emanate.

Omro.—This town is situated on a sluggish stream with low banks. Malarial fevers abound. We are supplied with pure fountain water, but drainage is very imperfect, and the surplus water from the fountains finds its way to the river under stables, out-houses, and through other impurities, impregnating the air by its evaporation.

Chippewa Falls.—Want of cleanliness, with slops and refuse, with improper food and stagnant water, have been productive of disease which might have been prevented by sewerage, and by draining and filling the low places, which are now receptacles of malaria.

New London. — Among other sources of disease, the defective arrangements of water closets and slaughter houses are prominent. The overflow of rivers filling low places with stagnant water has caused intermittent and remittent fevers.

Geneva. — A large number of cases of malarial fever, of severe type, have been caused by stagnant water in marshes, a majority of which could be drained.

Portage. — Dredging, in river and canal improvements, has exposed much decaying vegetable matter, causing intermittent fevers to an unusual extent. The sanitary condition could be improved by greater cleanliness. In many cases privies are only a few feet from wells, the soil being a light, sandy earth.

Fort Atkinson. — The drainage of marshes would improve the sanitary condition of this locality.

Neosho. — Better drainage of marshes, and more attention to the personal cleanliness of the people would decrease the amount of sickness.

Elroy. — I attribute the prevalence of malarial fevers here to exposure on cranberry marshes.

Mazomanie. — Drainage badly neglected, and drinking water selected with too little care.

Richland Center. — Drainage of cellars neglected.

Kilbourn City. — Present supply of drinking water is chiefly from cisterns. Good, soft water obtainable by boring into sand rock. Better drainage and greater cleanliness will lessen sickness.

Other quotations of similar character might be made to a considerably greater extent, but the above will be sufficient to show that there are abundant sources of disease which are preventable, and to indicate some of the channels of labor for this Board. Several of the correspondents make other valuable suggestions which cannot be here given; but I quote from Dr. Gott, of Viroqua, in answer to question No. 5 of the above circular, as covering perhaps more fully than any other single letter, points which are referred to in several:

Diseases are preventable “to a greater degree than is generally supposed:

“1. By the appointment of local boards of health in every city and township throughout the state, composed of competent physicians residing therein, in lieu of the town board of supervisors; such board to be required to report quarterly, or oftener, to the State

Board in respect to the sanitary condition of their respective localities.

“2. The State Board to recommend the more thorough and systematic study of the sciences of physiology and hygiene in the schools of all grades than at present prevails.

“3. To institute measures with the view to prevent the alarming prevalence of the crime of ante-natal murder, both in the ranks of the profession and outside of it; and lastly, to recommend to the profession of the state to do all in its power to educate the masses of the people in matters that pertain to their physical well-being by means of popular lectures from the rostrum, through the press, and by means of tracts. Let the profession once teach the people how to eat, how to sleep, how to work — in fact, how to live — and many of the diseases that flesh is now heir to will ultimately disappear.”

SEWERAGE AND DRAINAGE.

BY SOLON MARKS, M. D., MILWAUKEE,

Member of the State Board of Health.

It is not the purpose of this paper to attempt the advancement of anything new upon the subject of sewerage and drainage, as many volumes have been written by persons entirely competent to fully set forth the importance of sewers and drains, and all the details of their construction. It is simply the intention to gather such facts, from different authors, as shall be of practical benefit to those who are interested in preventive or state medicine.

Notwithstanding all that has been said and written, few persons have given thought to the subject, and fewer still have any adequate idea of the importance of these silent, hidden, subterranean guardians of the public health.

HOW SEWER PIPES SHOULD BE LAID — DECLINATIONS, ETC.

With regard to the sewers in the cities in our own state, it may be said that there is less fault to find with the materials than with the manner of laying. We have the hydraulic cement pipe, the vitrified clay pipe, and the common brick sewer.

Whatever difference of opinion may exist regarding the size and shape of sewers and the manner of their construction, all agree that the materials should be such as to prevent the escape, not only of the liquid portion of the sewage, but more especially of that subtle, deadly poison — sewer gas.

Formerly sewers were built much larger than was necessary to meet the ordinary requirement, in order to guard against obstructions. Experience has proven, however, that all unnecessary size, above the requirement of capacity, is actual injury, since it greatly diminishes the scouring power of the current. The smaller the drain that will carry the largest flow with which it is likely to be charged, the better is the scour, and the more likely it is to be kept clean.

If, through carelessness or otherwise, rubbish, such as broken crockery, rags, etc. — which they are not intended to carry — find their way into sewers, no amount of increase in size will prevent their becoming choked, and decomposition will inevitably go on, generating a deadly gas next to impossible to exclude from our houses with the system of traps now generally in use.

“ Drain pipes, whatever pattern be chosen, should be bedded in proper clay, and have the joints well luted; for if the joints be badly made, the liquid drainage will escape, and the sediment which is left behind may collect to such an extent as to choke the drain altogether. When drain-pipes are laid in cellar bottoms, it is a good plan to place them upon a bed of concrete, and cover over with a few inches of the same material. Wherever the drain-pipes pass through the walls, it is wise to turn a relieving arch over them; for, if a settlement should take place in the building, the superimposed weight will, in all likelihood, crack the pipes, and cause the drain to leak at a most dangerous place, or perhaps break them, and cause the greatest annoyance.

When drains are laid in new-made ground, unless care be taken to ram the earth sufficiently hard round about them — and this is next to impossible — the pipes will open at the sockets, and sodden the ground in their neighborhood to a dangerous extent. It is best in such a case, to rest the pipes upon boards laid upon occasional piles, or what is better, upon piers of brick-work.

It will sometimes happen that drain-pipes are laid in ground which may afterwards be penetrated by the roots of trees, shrubs,

and strongly-rooted weeds. A cure for such an invasion of the pipe joints, which will infallibly lead to choking the drains, has lately been pointed out by Mr. Mechi, and that is the coating them over with coal tar, since roots will persistently turn away from this material.

A matter of paramount importance is the declination which is given to the pipes. If this be inadequate, stagnation will ensue, and a costly and troublesome flushing be repeatedly necessary. Inside a drain in use, everything should be in gentle motion. If laid too flatly, the heavier effete matters are deposited and clog the way, and if the incline be extravagant, the water will hasten away and leave the solid wastes behind. In a late work, a writer states that too great a fall cannot be given to a drain; but when the fall of the tributary drain has been in excess, that part of the main drain which received the contents of such house drain will be found almost choked up. Some authorities formerly recommended a quarter of an inch fall to each foot, but the best practice is to allow a fall of $2\frac{2}{3}$ inches or 3 inches to every ten feet.

Drain-pipes can be too large. Some people use nine-inch pipes throughout a house, and think it commendable, when a four-inch pipe would answer every purpose. A four-inch drain-pipe for sinks, back-yards, and basements, is ample. Even the closet-drains in a house need not be more than six inches in diameter. Six-inch pipes well laid will suffice for the largest house, and in the largest mansion nine inches will not be required until it is sought to carry the sum total of the smaller sized drains away in one channel to the sewer or manure-tank. Drain-pipes of too large diameter are incompatible with that steady onward movement of the sewage which every addition to the contents of the drain beneficially increases.

The junctions of the drain-pipes should never be of the right-angled kind; an obtuse-angled or curved junction should be used; in other words, the sewage should be delivered in the line of the flow of sewage. A T or L shaped delivery is very apt to cause a deposit at that particular part of the drain.

It is considered wise to give the drain a little extra dip wherever a bend or junction occurs in its length, in order to counteract the effects of friction. A very small amount of dip will usually suffice. In laying down a system of drains to a house, it will ofte

prove beneficial and save much expense on some future occasion, if what is called a dummy junction be here and there laid in the march of the drain. The orifices of these junctions should, however, be stopped up with the disc-plugs sold for the purpose. A large pipe should never be delivered into a smaller pipe, or even into one of the same diameter. There should be a difference of three inches between the larger pipes, and of two inches between the smaller ones; for instance, twelve-inch pipes can deliver into fifteen-inch pipes; nine-inch into twelve-inch; six-inch into nine-inch; four-inch into six-inch, and two-inch into four-inch pipes.

Where a diminution in the drain-pipe is found requisite, the proper tapering pipes should be used; any other contrivance is at the best unworkmanlike.

A certain number of access-pipes will be often found useful if laid in a length of drain, say one to every ten of the socket-sealed pipes. Some pattern or other of these pipes, with a movable cover, might wisely be inserted close to all angles, bends and junctions, and a well-hole built round them to facilitate inspection.

The pipes should be so laid in or about a house that the human ordure may enter nearest the sewer, or, what is the same thing, nearest the point of delivery of the house drain, or the disconnection arrangements. The wastes from the sinks should enter the house-drain between the closet delivery and the house; and the rain water, if not stored, should enter nearest to the house. By this means, a persistent movement of the sewage is better obtained.

A flap-trap should be affixed to the end of the house-drain at its connection with the sewer or manure tank, so that if the sewer be surcharged at any time, it cannot flow up the tributary pipes. This contrivance will also tend to prevent a return of foul gases. An egg-shaped drain-pipe, laid from the disconnecting trap to the main sewer, secures the maximum speed of flow and the minimum chance of any solid deposit.

DISCONNECTION, VENTILATION, ETC.

Having all the drain-pipes carefully laid with the proper declination from the outer walls of the building to the street, the next thing in order for consideration is, how best to arrange the discharge from the various departments of the house. The common method is to run the street pipes directly into the house, joining the waste

pipes to them; but the consequences of such an arrangement are most disastrous, since the sewer air, when forced back in the pipes from any cause whatever, will be sure to find its way through the hydraulic traps, and permeate the atmosphere of the entire house. A safer plan is to disconnect the waste pipes inside the house from the street sewers, by allowing the former to discharge their contents into a chamber or tank, covered and properly ventilated, or, what will answer equally well, is a trap placed in the sewer, as near the outer wall as practicable, provided with a ventilating pipe, about four inches in diameter, running from it to the roof of the house, thus placing the poison beyond the power to do harm, and effectually preventing the passage of sewer-gas into the house.

SUMMARY OF VENTILATION.

All waste pipes of the house are to be disconnected from the sewer outside by means of chambers, tanks or traps, as near the outside wall as practicable, with ventilating pipes extending to the roof.

Rain-water pipes should never be relied upon as ventilators, since when they are most needed they are performing their own specific duties.

The soil pipes of closets should invariably have ventilating pipes running from each trap to the roof of the building, or into chimneys.

Every trap in the waste pipes inside the house should have a ventilating pipe, since even in waste pipes for the conduct of water only, the air will become foul.

The masses are slow to believe that the products of decomposition of animal and vegetable matter, generated in such small quantities that they cannot be recognized by the senses, can possibly give type and malignancy to disease. It is, however, a well known fact among medical men that an exceedingly small amount of sewer-gas, added to the natural causes which must inevitably surround us, may and does give a fearful malignancy to disease.

For instance, the natural causes with which we are brought in contact may produce diarrhœa, intermitting and remitting fevers, catarrhal difficulties, etc., which are, as a rule, easily controlled and seldom prove dangerous to life; but if we add a very small amount of the product of decomposition to the causes which have produced the above named diseases, we shall have instead, typhoid fever,

dysentery, and a host of other diseases equally dangerous to life. Hence, the vast importance of guarding well every avenue by which disease may enter our households, by giving heed to the warnings so frequently sounded in our ears concerning the present system of ventilating the channels that are intended as the conservators of health. "Verily, a man's foes are they of his own household."

The best means should be procured for flushing drain pipes at least once a quarter, and the outlet, an access-pipe opening, or the point of disconnection, watched to see that the flow is unimpeded.

Some people flush the drains by removing the sink-trap and allowing a cistern to be emptied through the water tap into the drains; but this is for the most part useless, and the very term "flushing" means the imparting of a rushing action to a body of water—at least that is the only effectual method of cleansing underground channels.

To provide an efficient quantity of flushing material where water works have not been introduced, the rain water may be stored in an upper or underground cistern, and when the drain is opened, the water having been caused by flowing or pumping to fill a large tank, above such opening, one side of the tank should be made removable, so that at a given moment a thorough scour may be insured.

Proper openings for this purpose should be left in the drain, both below and above the point of disconnection; but these should never occur inside the house, as is but too common, for, as the water runs down, the foul gases levitate and invade the house. Sometimes a cheap disinfectant may with advantage be added to the flushing water. After this flushing, in all likelihood, any syphon traps in the line of the drain will be emptied, and it is necessary to pour a small supplementary supply of water gently into the drain before leaving it.

Should the drain from any cause be stopped up, which will be readily ascertained, a series of swivel-jointed rods, such as are used by chimney sweepers, but with a roller at one end, or a series of Malacca canes, screwed together, should be pushed up the drain.

It is here where the access pipes perform excellent work, since if the rods or canes cannot reach the matted obstructions at one place, they can do so from another point.

A correct drainage plan, showing the different size of pipes used, the positions of bends and junctions, the site of syphon-traps and access pipes, the depth from the surface and the nature of the ground, should always be prepared when the drains are first laid down. This may save much future inconvenience. *Fassie's Sanitary Arrangements for Dwellings*, pp. 21 to 27.

DISPOSITION OF SEWAGE.

That the rivers of a town should not be converted into vast cess-pools, to breed poison for the slaying of its inhabitants, would seem too nearly axiomatic to require demonstration; and yet we find this to be the almost universal practice.

London poured the effete matter from its thousand sewers into the Thames, till both river and atmosphere were reeking with sewage poison, and the horrified savans of Parliament were about taking themselves to some more favored locality, when Mr. Bazalgette, a civil engineer of high repute, came to the rescue and devised a system of intercepting sewers, which should carry this engine of death to a point whence the daily ebb-tide would take it out to the ocean.

Birmingham, in 1848, "expended £200,000 in constructing sewers with their outlets into the rivers Rae and Tame, one of which is six feet and the other twelve feet wide. In 1858, the pollution had become so great that a chancery injunction was served upon the city to prevent the continuance of the evil."

Leeds polluted the waters of the River Ayr, in the same manner, till an injunction was served upon it also.

Manchester, with a population of 356,000 discharged its sewage, up to a recent date, into the rivers Irwell, Irk and Medlock, until they "became filthy in the last degree." Then came the health committee, trying all sorts of expedients to abate the nuisance.

Notwithstanding the 200,000 francs per year which Paris pays for removing sewerage deposits from the bed of the Seine, it is still so seriously polluted as to call forth repeated remonstrances as to its condition.

"The city of Dublin, with a population of less than 300,000 inhabitants, situated similarly to Milwaukee, a river running through its centre, and all its sewers entering the river at various points along its quay or docks, was so afflicted with its bad odors and un-

healthy emanations that various devices were suggested by engineers to rid the city of this great nuisance — such as covering the whole river, and constructing a grand boulevard — running a railroad down the center between its walls, and dividing the stream so as to increase its force and ability to scour the river, and various other methods.

“The London plan, I have been informed, is now settled upon, and intercepting sewers will soon be constructed, at an estimated cost of one million of dollars, to convey the contents of the main sewers, three miles below the city, where it can be carried out by the tide to the ocean. The utilization of sewers has not as yet engaged the attention of American agriculturists, but it has for ages been used as the best fertilizer for worn and exhausted lands in Europe, and when properly prepared, is equal in value to the best guano. According to Mr. Norwood’s account the meadows about Edinburgh have been enriched by the sewerage of that city for 150 years. He says: ‘The most effectual plan for cleansing rivers is to prevent, by interception, the influx of town sewerage into them, and that sewerage, when kept in motion, either in the culverts, carriers, or on the fields, is inoffensive to the senses and uninjurious to the health.’

“It may be thought by some that the small amount of filth entering the Milwaukee river, could not, for a great many years, be offensive or injurious to health. To suppose this is a great fallacy, when it is known that the amount of solid sewage to each individual per day is 3 ounces, and of liquid sewage 42 ounces. Estimating our present population at 100,000, there would be poured into the river, provided the privies, water-closets, and cess pools connected with our dwellings were emptied into the sewers, nine tons of solid sewage and 126 tons of liquid sewage daily, or, in one year, 3,385 tons of solid sewage, and 45,800 tons of liquid sewage. As the population increases the nuisance increases.

“No one for a moment will suppose that this huge mass of filth, deposited in a currentless river like ours, can be inodorous and harmless. * * * I think I have stated sufficient upon this subject to enlist the attention of my fellow citizens, and of the city government, to the application of the necessary remedy before more money is expended upon a system of sewerage that will soon turn out to be a nuisance of the worst kind.”

These words of warning and of kindly advice are from the pen of James Johnson, M. D., health officer of the city of Milwaukee, (seventh annual report), and it is much to be regretted that the authorities of that city did not accept and act upon his suggestions and plans of intercepting sewers, since it would have saved what will soon be rendered imperative, another immense outlay of money for sewerage.

DRAINAGE OF BUILDING SITES.

Statistics have proven that surface water is one prolific cause of consumption and kindred diseases, yet how few examine the condition of the soil below the surface when locating their homes.

It is not that men are indifferent to the causes which produce disease, but because they are so absorbed in their various occupations and professions that these primary considerations are lost sight of.

It is a fact well known to civil engineers, and others who have given the subject careful attention, that sewer pipes, absolutely impervious to water, act as drains to the soil in which they are laid, and, if placed sufficiently deep, will, to a very great extent, remove the surface water, thus rendering wet and unhealthy localities dry and salubrious.

Even the drying of soil in the laying of sewer mains in cities, has led to a perceptible diminution of lung diseases in the districts where they were laid.

The first consideration in building a homestead, either in city or country, should be that the foundations be laid in ground that can be thoroughly drained. The drainage should be arranged after the best methods, and with the greatest possible care that all the conditions of soil are perfectly understood. The house should stand upon the highest elevation in the plat of ground designated for the purpose, with south and east exposure if possible, and well removed from too much shade, since a superabundance of trees and clinging vines causes a dampness of the atmosphere of the house, that cannot be remedied by any amount of drainage, and this increases the pressure of the blood on the internal organs, lessens the discharge of water from the skin, and elevates the temperature of the body, thus causing congestions, etc. Let pure air and sweet sunshine have free and unimpeded access to every part of the house, thus insuring to its inmates health and cheerfulness.

See that the drainage is absolutely perfect, "else manifold evils may fall upon the loved ones."

Country homes should be supplied with every facility for the discharge of all the waste water and effete matters of the household, as these should be carried beyond the reach of harm to others, and at the same time so far removed from the well and cisterns that it will be impossible, by any percolation through the soil, that these should be combined. A sure way of avoiding any such contingency would be to have closely cemented tile drains, carefully glazed on the inner surface, for the conveyance of all refuse matter, to a distance of not less than five rods from the house, where it may be deposited in any open trench, with grape vines surrounding it.

The location of the barns, stables, piggeries, privies, etc., should have regard to the water supply for drinking and culinary purposes, as well as to the house itself, else disastrous consequences may result.

"It has been truly said that no man is so poor that he need have his pig trough at the front door, and if we cannot, single handed, drain a town, we can, at least, keep decent our homesteads."

"We see that the well are made sick, and the sick are made worse, for the want of the two elements which a good God has given us absolutely without measure — pure air and pure water. From tooth-aches to typhoids, from the neuralgias and rheumatisms that keep us in torment and will not even let us escape by death, to the fevers and cholera, which strike us down almost without warning, and even from consumption, slow but sure, we suffer in great measure because we breathe bad air and drink bad water. We see too, that often, if not usually, the air is poisoned by emanations from stagnant water, either that which is naturally in the soil or in pools and holes about us, or that which we have rendered corrupt by the ordinary and careless arrangement of buildings for our families and our domestic animals.

"The water of our springs and wells is corrupted by drainage from cess pools and sinks, so that we ourselves systematically poison both the air we breathe and the water we drink." Fourth Annual Report of the Massachusetts State Board of Health.

It is a common practice, in the country, to have the well, for watering cattle, in the barn yard. This is a very pernicious practice, since the water — being necessarily impregnated with the

juices of the animal deposits — is as unfit for beast as for man. That the milk of cows is frequently poisoned by drinking bad water, has been proven in numerous instances.

After using every precaution within our knowledge to insure healthy conditions to our families, we are still largely at the mercy of our neighbors. For instance, the brook that sings through our meadows, refreshing man and beast with its clear, sparkling waters, may have in solution the effete matters of neighboring barn yards, privies or slaughter houses, thus pressing to our lips the chalice of death.

Let no man deceive himself with regard to the oxidizing and disinfecting properties of air and earth on such waters. An amount of exposure to these influences that would resolve the dead organic matters present in water into harmless mineral compounds, will certainly fail to destroy those constituents which are the germs of zymotic diseases. Germinal matter is only destroyed by death.

“The most recent experiments tend to show that we have been vastly overrating the oxidizing and disinfecting properties of air, water and earth. There can be no question of the fact that we are drinking water and breathing air contaminated by sewage and sewage emanations, and the fact is admitted that both air and water may be polluted to a dangerous degree without perceptible change in taste, color or smell. We must not deceive ourselves, because poisons do not ‘slay like the sword,’ because long habit gives us a certain kind of immunity from evil results, and because, in our new and sparsely populated country, we have a soil not yet saturated with the filth of centuries.” Sixth Annual Report of the Massachusetts State Board of Health.

It is related that “in Switzerland the dejections of typhoid cases were cast into a running brook irrigating a meadow, filtered through a *mile of porous earth*, and reappearing as a spring, from which the people of a town drank. This acted as a source of the disease, and struck down more than seventeen per cent. of the inhabitants.”

The Boston Journal of Chemistry, in an article entitled, “The Lesson of the London Pump,” says: “The good people of certain quarters of London have been much stirred up of late by the attacks of malicious sanitarians upon the reputation of the venerable town pumps.

“A famous old pump at the East End, known as ‘Aldgate Pump,’

was the first against which these officious people, who want to interfere with the inalienable right of their neighbors to poison themselves, directed their spite.

“Now the water of this ancient well has a traditionary celebrity in the district; so much so that many of the inhabitants consider that a morning draught from it is a sovereign remedy for certain ailments, and send for the water from long distances when they feel ‘out of sorts.’ The flavor and appearance of the water are in keeping with its good name. It is clear, sparkling, and has a cool, saline flavor which is very agreeable to the palate, and which is harmless enough when the saline ingredients are not accompanied by organic taint. In this case, however, the analysis made by Professor Wauklyn shows that the cool, refreshing flavor is due to the impregnation of the water with salts derived from decomposing sewage, which evidently finds its way into the well, partially filtered and decomposed by the surrounding soil. The soil itself is heavily loaded with organic matter, and does not form an efficient filter; thus the water is polluted with a considerable amount of organic matter. But, for all this, the popular feeling in its favor is so strong that resistance has been made, on the ground of certain ‘city privileges,’ to closing the well, and it is said that an appeal to the home secretary will be necessary to prevent its further use.”

This case led to an examination of the other London pumps, and Frankland states the result in a letter to the *Times*:

“Samples collected from all the known shallow wells in the metropolis, having been analyzed in the laboratory of the Rivers Pollution Commissioners, were proved, with but two exceptions, to consist chiefly or entirely of the soakage from sewers and cess-pools, and some of them actually had a manure value 150 per cent. greater than that of average London sewage! One or two had a slight saline taste, piquant to some water drinkers, but most of them were bright and palatable, and the pumps yielding them enjoy for the most part as high a reputation with street commissioners as Aldgate pumps had had.

“These facts are worth recording as curiosities of history in this nineteenth century, but we allude to them mainly for the sake of emphasizing what we have more than once urged upon the attention of our readers, namely, that very bad water may not seem to

be bad, but on the contrary very good, when judged by its taste and smell."

When we have once educated the people to an appreciation of the fact that a homestead built on undrained soil is the certain abode of death; that houses with their water supply and privy vaults in close proximity, are nothing less than highwaymen who watch for our lives; when we convince them that certain conditions, either of soil or dwelling, will certainly produce death, then will they begin to understand and appreciate the importance of a thorough system of drainage as well as the proper arrangement of the water supply of their buildings.

VENTILATION OF PUBLIC BUILDINGS AND DWELLING HOUSES.

BY GEN. JAMES BINTTIEFF, JANESVILLE,
Member of the State Board of Health.

Great plagues and epidemics have ceased to ravage civilized communities, as was their wont, and the mean duration of life is steadily increasing. At Geneva, in the sixteenth century, the mean probability of life was under nine years; by slow steps, progress was made to fourteen years, in the seventeenth; thirty years in the eighteenth; and in this century, the limit is rapidly approaching forty-five years. The improvement indicated within three centuries has resulted from advancing knowledge and more enlightened practices for the maintenance of life in health. This country has not kept pace with the better ratio observed in Geneva, mainly because there has been a lack of attention to the grand principles and essential details of sanitary reform. Dr. Rush was our only author discoursing on this pregnant subject prior to the year 1863, and it was not until six years later that a State Board of Health was organized in Massachusetts, that being the first established in this country. Circumstances controlled the popular mind in other directions, while Europe was multiplying such institutions; and in consequence the vital statistics of that state compare unfavorably with the average of trans-Atlantic communities similarly enlight-

ened. In estimating the value of life, it is important to ascertain how many days of sickness are included in the sum total of existence. In Europe the average duration of sickness for each individual is a fraction less than 20 days per year. Massachusetts is divided into six geographical sections for the compilation of returns, supplying information similar to that collected by European boards of health; and from those figures we learn that the highest rate of incapacitation through ill-health obtains in the Boston division, where the average is 24 days per year, or one-fifth more than the percentage exhibited in Europe. This does not result from any cardinal defect in the climate, as the Berkshire Hills division shows a total of only 14 days; or less than two-thirds of the European average. The whole state presents a total more favorable to health than the Boston division, the rate being 17 days to the year; but in that respect a marked decline is observable, the average for eight years, ending with 1872, having been only 14 days, or three days less per capita than the ratio obtained in the year last named. In this state we possess no statistics which will enable us to compare the individual results of incapacitation by sickness with the Massachusetts tables; but we may be sure that our loss approximates thereto. The money value of the labor lost in Massachusetts by sickness alone has been estimated for one year, at \$39,146,980. The reader will draw his own conclusions as to the figures which may represent our losses on that score.

Every man must die; but a large proportion of the sickness commonly endured is known to be preventable, so much so, that it is assumed that the death rate, which exceeds 21 per thousand per annum in Milwaukee, and 30 per thousand in Boston, could be reduced, with proper care, to 11 per thousand. Sanitary science offers means for the perfection of human government toward the point indicated; but we are slowly reaping its advantages. Ventilation is but one of many subjects which should command universal attention. Upon the realization of efficient ventilation depends life, health and happiness for untold millions who shall inherit this fertile land; hence it is impossible to overrate its importance. Two-thirds of all the funds now being expended in the maintenance of benevolent institutions might, with advantage, be devoted to the procurement of better hygienic conditions for the classes from which our state institutions are filled with chronic misery, allied to

physical and moral decrepitude. Prevention is barely possible with the means at our disposal; but once the operating causes have eventuated in disease, insanity and crime, no human instrumentality can effect a cure. A sound mind can seldom be discovered unless associated with a healthy body.

The major portion of the work to be accomplished must be devolved upon individuals. Culture, which means more than collegiate training, and does not necessarily include erudition, should produce perfect humanity; well developed in mind, body and estate, capable of perpetuating the best qualities of the race; and, therefore, able to appreciate all the circumstances that favor its highest development. Governments can only assist what the individual may directly accomplish. Associations, however wisely directed, must depend for their ultimate success upon the intelligence of the mass to which their representations must be addressed; and for the amelioration of which their organizations are intended. The hope of society rests on the growth of personal enlightenment.

EARLIER TRACES OF VENTILATION.

Five thousand years ago, when the plans for the pyramid of Cheops may have been in preparation, there was more knowledge among the learned, as to ventilation, than we find to have been in existence among Anglo-Saxons a century since. The great pyramid had an arrangement for the ventilation of its interior chambers. The information implied by that provision, contrasts with singular force, when we consider that one hundred years ago in Plymouth Sound, within sight of two marvels of engineering work, the breakwater and Eddystone lighthouse, a man was permitted to sink himself in a strong box, in fulfilment of foolish wagers, because the scientific men of the time and the governing classes were alike ignorant as to the necessity for fresh air to maintain life. The death of that man remained an unsolved problem for many years. Egypt had no darkness to parallel such ignorance. Little more than a century earlier, the president of the college of physicians, in London, in an inaugural address, informed his fellow physicians, that no one knew, nor ever could know what purpose was served by the phenomena of breathing. Samuel Pepys records the fact, in his visit to Gresham College, in these words: "What among other fine discourse pleased me most was Sir George Ent about respiration;

that it is not to this day known, or concluded on among physicians nor to be done either, how the action is managed by nature or for what use it is." Sir George Ent was a University graduate, a Fellow of the Royal Society and a leader among the scientists of his day. The question of ventilation was thus authoritatively placed beyond the realm of investigation.

The knowledge which the Egyptians possessed had probably come to them from a much earlier time, by intercourse with the highly civilized Ethiopian nation, inhabiting Arabia Felix and the coast. The Greeks and Romans certainly possessed such information, seeing that the early temples of Esculapias were *Sanitaria* rather than medical schools and that Hippocrates wrote the earliest hygienic treatise now extant, treating of "Airs, Waters and Places." Means of disinfection were used at Athens during a plague; the agency of fire, which is only now beginning to be again recognized, having been used by Acron of Crotona, with great advantage to the city.

Ancient Rome appreciated sanitary art and appointed officers to superintend the construction and management of buildings, public and private, to secure salubrity and safety. The Mosaic ceremonial laws, which had their origin in the enlightenment of the court and priesthood of Egypt, were found upon correct information as to human requirements; and Moses regulated the food, purifications, ablutions and other necessary details towards the maintenance of the health of the Jews, who are at this time the most healthful and best preserved of all the races on earth. The Greeks cared as much for the physical as for the intellectual supremacy of the people; and in their cities, public baths were provided for the poor as well as the rich. The Romans imitated this feature of Greek civilization, and, also, following the example of that nation, Antoninus Pius initiated the appointment of medical officers, in Roman towns and cities, to preserve the general health. Health institutions now existent in Germany and Italy find their origin in the days of Antoninus. The buildings constructed for public baths contain provision for ventilation as well as for heating, which soon after the influx of barbarism fell entirely into disuse. How completely the scientific acquirements of the ancient world had been lost, can be seen dimly in the records of the dark ages, which may be said to have covered the whole earth, seeing that India, once a focus of

enlightenment, witnessed the wholesale slaughter of prisoners in the Black Hole at Calcutta, by foul air, in 1756, because the authorities were ignorant of the laws governing ventilation. Among the common people there came to be a stupid horror of fresh air and the professional classes were too besotted by prejudice to lift their patients out of the mire.

NECESSITY FOR VENTILATION.

Human life demands fresh air, which must be in some degree pure. Eight parts of carbonic acid, to ten thousand parts of atmosphere, has been named as the maximum of impurity that can be endured without injurious consequences supervening. Unfortunately in most of our public buildings, schools among the rest, the proportion commonly obtained is five times as great as that indicated by science as the ultimatum. The body has a wonderful capacity to adapt itself to surrounding circumstances. When the lungs fail to purify the blood, the liver comes to the rescue and is proportionally overworked. The fœtus supported directly from the circulating system of its mother and having no action of the lungs to cleanse the vital current, develops a corresponding proportion of the other organ, which, at the time of birth, is always largely in excess of the post-natal requirements of the system. With food of another class less prepared to sustain life, the breathing apparatus comes into operation and the liver generally decreases in relative size. In latter life the two systems of purification supplement each other, on the same principle, hence minor impurities can be endured without immediately poisonous results. Children fall sick in overcrowded school-rooms and nausea relieves the stomach from food which the want of sufficient oxygen and the presence of animal impurities in the air, combined with carbonic acid, has rendered noxious to life. Such incidents are too common to procure from the average observer such attention as they deserve.

It is not too strong an expression when we assert that millions of human lives have been, and are being sacrificed for want of care as to this primal necessity of our being, ventilation.

The president of our State Medical Association, Dr. J. B. Whiting, in the last annual address to that society says, with much force: Our children are crowded into school rooms that have little or no ventilation except as the heat of summer admits of opening doors

and windows. From fifty to seventy children are often kept in a school room by the hour when the supply of fresh air is not sufficient for one fourth that number. If any one doubts this, let him visit the primary departments of the schools in this state at a season of the year when artificial heat is required, when doors and windows are closed, and he will find the atmosphere of the room not simply impure and oppressive, but offensive and disgusting to the sense, and his first impulse will be to escape. If he remains, the offended sense soon ceases to protest and the visitor breathes the contaminated air with seeming impunity. But the little ones, who are compelled to live in such atmosphere day after day and month after month, do not thus escape. The more robust live through it; but the delicate ones succumb to the poison and fall out of the ranks."

Happily this subject is now commanding attention in every part of the Union. Men remember the quaint saying that, "our fathers who lived in houses of reeds, had constitutions of oaks, but we, who live in houses of oak, have constitutions of reed." The sentence serves to arrest the thoughtless to a grave subject, although it is untrue in its essence. The men who in hyperborean regions would attempt to discharge the functions of life in houses of reeds would not transmit to their offspring constitutions of oak. The house must be well constructed for shelter from the elements, as well as for ventilation, if the highest purposes of life are to be aided by urban existence. The latest results in vital phenomena sustain the story of the ages that with every century of civilization there is a large appreciation of individual endurance; a fact that directly contradicts the existence to which we have referred. The house of reeds was, in many respects, as ill ventilated as the most compact dwelling house of to-day; and where the largest fires were maintained it was barely possible for the resident, perpetually revolving before its blaze like a spitted turkey, to thaw one side of his refrigerated body before the other had become frozen. Between the two styles of dwelling there is merely a choice of evils; but the houses of to-day, ready to our hands, systems of ventilation may be devised which will cheaply and greatly enhance the comfort and duration of life.

A human being requires, at the very lowest estimate, 350 cubic feet of air every twenty-four hours; and the authorities assert that 360 cubic inches per minute is the quantity demanded for the respirating process by every healthy adult.

The requirements of children are but little less. Air that has been breathed is rendered unfit for further use, temporarily, because it has lost a portion of its free oxygen; has become charged with carbonic acid to one hundred times the former volume of that ingredient, and has become impregnated with an animal vapor such as offends the nostrils in every crowded room. The presence of carbonic acid is made the test of impurity, but animal effluvia constitutes a terrible factor of sickness. Could some process be devised to separate the vile components from the better air, as we winnow the chaff from grain, without exposing children and adults to the breezy process used as an illustration, that would be the sum of excellence in ventilation; but no such scheme has yet been put into practical form.

The best device only aims at diluting the foul air confined in an occupied room, by the introduction of currents from the outer atmosphere; hence, a much larger supply than is needed for breathing is necessary for the preservation of health. Evidence has been accumulated from many states illustrating the evil consequences of breathing impure air. One authority says, after twenty years study of the subject, "many cases of consumption, heart disease, and kindred evils, originate in the foul air of school rooms and other crowded places. Dr. McCormac contends that consumption and all tubercular diseases result from breathing air already vitiated by respiration. Life cannot be enjoyed nor realized in its highest excellency, unless a sufficiency of pure air is supplied at all hours, sleeping and waking, and the scholar or literary man, whose sedentary occupation and brain labor make special demands upon the vital power, should be in an exceptional degree cared for by a supply of oxygenated air.

DEFECTS OF PUBLIC BUILDINGS.

"France wants good mothers," was the doctrine of Napoleon, reviewing the necessities of his empire. That want must be realized by every nation, and is theoretically recognized in this country; but our school system, which is oppressive to both sexes, is specially injurious to girls at the age when they are approaching womanhood. Excessive labor, mental or physical, imposed upon children, retards and deteriorates development; but there are seasons when the brain work of the school room would alone prostrate

the nervous systems of our girls; yet it is a fact within the knowledge of every expert, that our school buildings appear to have been constructed with the express design to superadd physical exhaustion to the other destructive forces that threaten the lives of the future mothers of America. Dr. Clark says, "the sick chamber, not the school room, the physician's private consultation, not the committee's public examination, the hospital, not the college, the workshops, not the parlor, disclose the sad results which modern social customs, modern education and modern ways of labor have entailed on woman." Dr. Fisher says, "for the sake of a temporary reputation for scholarship, girls risk their health at the most susceptible period of their lives, and break down after the excitement." These opinions glance at our modes of education only; but the ambition of school boards to erect showy buildings, the architectural proportions of which shall tower above surrounding edifices, compels the young to ascend and descend interminable flights of stairs day after day, thereby terribly increasing the pains and penalties which are exacted by our educational experiments. It is well that bodies should be developed as part of the educational process; but stair-climbing is not of itself a desirable accomplishment; and physiological reasons, unanswerable in their force, argue against the continuance of the perilous practice.

In great cities it may not be possible to build the suits of rooms necessary for school purpose in structures of one story; but even then it may be worthy of consideration whether suburban sites, easy of access, may not with advantage be substituted, where all the training of the lyceum can be afforded on one floor, in houses not too high to permit of their being readily warmed and ventilated, cheaply and well, nor too expensive to allow of sufficient floor room being given to each individual. Another generation than the present will conclude to use the pretentious school buildings of to-day for other purposes in which adult humanity is concerned, so that our girls may have a fair opportunity to develop into the strength and beauty that are essential to the fruition of maternal solicitude. The expense involved in the additional outlay will prove a bagatelle in comparison with the gain of health and vigor to the community. Systems of schooling do not fall within our province; but the construction of edifices in which the business of training shall be carried on is of paramount importance, upon the evidence before us,

when we contemplate the physical wrecks which have resulted from the continual stress on muscle and nerve involved in our efforts to extend the blessing of intellectual culture to the rising generation. The brain, abnormally excited, affords no compensation for a debilitated frame. The extra demands made by cerebral development tend only to exaggerate the suffering incidental to an unwise stimulation of mental power.

Proper ventilation is impossible unless our buildings are so constructed as to permit of the best processes being carried out in their integrity. Many of the finest buildings in this country, considered merely as architectural beauties, are uninhabitable during winter in consequence of defective managements for heating and airing the several apartments. It is doubtful whether any process yet in operation fully meets the demand for ventilation; but probably the Ruttan system, which comes nearest to success, may, after a series of tentative experiments, become sufficient for all purposes. Mr. Leeds, in the *Sanitarian*, presented a plan for which he received a premium at the Vienna Exposition. The veteran architect insists that sunlight and its substitute, warmth, are absolutely essential to all natural systems of ventilation; and, of course, none other can be effected. The best contrivance will be that which utilizes within doors the forces now operating on the earth's surface, by the winds in their circuits and the sun's rarefying power to remove impurities from our dwellings. He would have the floors and walls kept warm, and he claims that cold air for breathing would not, under such circumstances, be found hurtful. With all deference, we believe that the pupils would attain better results, supposing his design reduced to practice, if the atmosphere, as well as the dwelling itself, could be brought to such a temperature as the sun gives at noonday in autumn. It is indeed too true that in many buildings, private as well as public, upon which large sums have been expended, a difference of from 12° to 15° may be found between the heat of the room at six feet from the floor and that of the floor itself. Not long since a teacher said, when speaking of a very costly structure, that the children taught there must stand upon their heads if their feet were to be kept warm and their brains cool during tuition. Scarcely any man has ever sat in our average public buildings without realizing a similar condition. We are constantly reminded that the blood circulates more vigorously and that

our nerve force is greater when we are surrounded by a warm atmosphere, and Mr. Leeds' suggestion, that the walls and floor should be kept warm by express design, would operate still more beneficially by volatilizing the foul accretions which tend to adhere to cold walls and the lower stratum of atmosphere in our rooms.

The Ruttan system aims at making the house breathe; that is the design of the best process yet submitted; and, if it is not invariably successful, it is not for want of a correct appreciation of the great purpose which the architect should keep in view. The ventilating shaft, constructed in the center of the building, is traversed by the smoke pipe, which serves for the whole structure; and this, by its warmth, compels a current of air, such as it is claimed will not fail at all seasons to carry off the atmospheric impurities collected from all parts of the building. The furnace, admirable in construction, sends its superheated smoke over the building to radiate warmth before it departs by the flue; and the warm-air pipes convey to registers in every room a supply of heated pure air from without. Over the furnace is a continuous warm-air flue which can be tapped by the teacher to supply any lack of atmospheric freshness which the registers may not fill. After the heated air has passed through the building, traversing under the floor, specially raised for the purpose, through the partitions and over the ceilings, so that all the advantages of the Leeds scheme have been attained, the foul air having no outlet but by the shaft already described, must return to the basement of the building, radiating in its travel the last degree of its available caloric before passing through the tall chimney into the upper region of the atmosphere. Objectors to the system, as now operating, contend that, when contrary winds prevail, the foul air is liable to be forced back in the building with results disastrous to comfort, and that the draught does not operate on all the rooms alike. It is even said that some rooms in well constructed buildings have altogether failed to procure ventilation under certain conditions. It has been suggested in reply that the inconveniences deprecated as likely to result from contrary winds may be minimized or removed entirely by increasing the height of the conducting shaft and the temperature therein. The answer seems to be conclusive. The second objection that some rooms are not ventilated at all, or partake in the general advantage insufficiently, may be found on further experience to require graduated

escape pipes traversing the common flue, adapted to carry the foul air from each story; but a matter of detail so small as that need not be discussed in this article, as the company concerned in introducing the system, confessedly the most successful, will not fail to adopt every substantial improvement.

Ample experiments have demonstrated that pure air may be introduced into a room either at the top or bottom as may be most convenient; but the foul air should always be removed through the floor or on a level with it, and conducted to some central reservoir at the base of the ventilating shaft. The French architects, who have paid special attention to this subject, object to conducting the foul air from each story of a building upward to where the separate foul air flues unite above the ceiling of the upper story, because for this method a greater length of flues is necessary to accomplish the object; but, in cases where it is deemed desirable to carry the vitiated air from each story directly into the ventilating shaft, then this shaft must be divided into as many distinct compartments as there are stories in the building.

Ventilation during the summer can be secured by the same system of house-breathing by causing a fire to be ignited at the base of the foul-air shaft. The current of air thus caused will afford thorough ventilation with cool air, without the necessity to open one window in the edifice. The advantages accruing from the exclusion of hot air, dust and insects need not be enforced. We would have the main expense incurred in the preparation of school buildings devoted, not to adornment, much as we admire beauty and value its æsthetic worth, but to the procurement of efficient ventilation at all seasons and healthful warmth in winter.

Reference has been made to the necessity for additional floor-room in school buildings; and in some degree the same want is experienced in all public buildings. Many persons suppose that if the requisite space in cubic feet is given for each individual, it matters not whether it is supplied in height or in breadth. No error could be more pernicious. The breathing room of the individual must be comparatively near to his own level and unless it is sufficient to protect him from breathing the impurities emitted from his own and the neighboring lungs and bodies, he cannot fail to be poisoned in a greater or less degree by the noxious effluvia which every animal emits. The number of diseases arising from this

cause cannot be stated; but evidences go to show that hundreds of thousands of lives are thus annually lost. The most moderate space assumed to be compatible with the maintenance of health is 25 feet of floor space and 300 cubic feet of air space with the proper ventilation for each pupil. With this amount of space, ventilation can be secured, and the proportion of carbonic acid kept down to the standard required for healthful action, by having means for the introduction of pure air equal to ten or twelve square inches for each person to be supplied, and with egress flues for the vitiated air of fully equal capacity; but to accomplish this the difference in temperature between the air in the ventilating shaft and that in the rooms of the building must be such as to secure a motion equal to supplying 3,000 cubic feet per hour for each person. When that provision has been supplied the stigma will be removed from our school system that it causes three-fourths of all the cases of lung disease known to prevail among children.

IMPORTANCE OF THE PROBLEM.

It is not easy to overrate the magnitude of the subject submitted for consideration. The court house, the legislative chamber, the public hall, are important, because therein the laws, the administration and the beneficial amusements of the people are dealt with; and it is necessary that health should be compatible with the discharge of all our duties and the realization of proper pleasures. The ventilation of churches should receive ten fold more attention than has been given; but, in such buildings, the time spent by the average worshipper is small during the several services. The school should command the first and largest meed of vigilance, because therein those who are helpless require our protecting care, and upon the fulfillment of our obligations to them will largely depend not only their happiness and health, but the future prosperity of the nation. The boys and girls of to-day may be the fathers and mothers of many who will witness the next centennial celebration, and the highest product that we can offer for the approbation of the world is a better citizenship than that which ushered in the display in Fairmount Park. It is not enough that we can send the work of our looms to Manchester, to be sold in the home of the cotton trade from which all nations were once supplied. We must be able to show that our free institutions and numberless advan-

tages have attained for us commercial, inventive and manufacturing preeminence; because of the noble manhood builded on this continent, in token of our thankfulness to Almighty God for the manifold blessings wherewith He has surrounded this nation.

MENTAL HYGIENE.

BY JOHN FAVILL, MADISON,

Member of the State Board of Health.

What shall we eat, what shall we drink, and wherewithal shall we be clothed? are fundamental questions which must be rightly answered in providing for the body. Fortunately, in the large sense, nature suggests answers.

But when we set about providing aliment for the mind, the problem becomes exceedingly complex. How much, what kind, and how to be administered, are among the leading questions of the age. It is not easy to know how to grow strong, long-abiding bodies. It is much more difficult to know how to grow strong, enduring, useful minds.

On the whole, bodies are underfed. On the whole, minds are in a state of starvation. The reason both are not in a state of starvation is, that the body when hungry, cries out for food, and will have it by means fair or foul; while the mind, without food, becomes torpid, and freezes to death without knowing it.

It is not the purpose of this paper to discuss the essence of mind, nor its relations to matter, except through the more common or coarser analogies.

When shall we begin to feed the mind of a child? Obviously, when it begins to show signs of capacity to digest ideas or notions. This digestive capacity may appear very early, or it may be delayed. Doubtless most children may be taught many useful things, at six months, especially may they be taught obedience. Woe to the poor mother who postpones such teaching too long; contempt, caprice, and slavery are her inevitable doom. Few young children are ungovernable, if judiciously handled; but if contests become frequent — if force has often to be met by force; if will has often

to be pitted against will — you may better abandon the contest and trust to time and the development of mind and a higher moral sense — better almost anything than frequent collision.

When shall a child be taught to read? When the broomstick, and the doll, and old Mother Hubbard, and Grandma's stories have lost their zest, and the child becomes restless and begs for "something to do." And it matters little at what age, or what may be its physical condition. Give it food. And the little ones whose mothers are neither so ignorant, nor so burdened by poverty and care, nor so oppressed by the frivolities of fashionable life, but that they can take them in their arms and feed them are "thrice blessed."

Nature begins to help the little ones right early — to determine what is good for the body. Taste says sweet — and the body approves. Taste says bitter — and the body rejects. Not so with the mind. It hungers — but knows not sweet. It hungers — but knows not bitter. It will feed on garbage and grow. The body can eliminate what does not subserve its purpose, the mind can not. Woe to the parent, woe to the teacher, woe to every one who gives it unwholesome food.

No age can be fixed when systematic teaching shall begin, but it should begin early — if possible it should begin at home. The young brain is too receptive, and has too little power of discriminating, to be trusted to large, or doubtful associations. Hence the great utility, if not necessity when practicable, of keeping it within the sphere of loving hearts and judicious tongues, until it has acquired a habit of right thinking and correct behavior. Then, when it falls into the great march of life, when it adopts the street and the rough of the school — the little brain, preoccupied by the loves, and thoughts, and humanities of home, will resent the intrusion of evil thoughts and vicious ways. And although the conflict of the following years may be sharp, and the victory at times doubtful — yet shall the home bulwarks be impregnable.

But the time has come, when the most of us must entrust the mental weal, and in some measure the moral health, of our children to others. Pity the parents whose hearts do not throb, whose eyes do not grow dim, as they launch their little ones upon the sea of life.

The common school is the crowning glory of the age. Doubtless it is the world's highest expression of civilization. With us, teach-

ing the young is largely entrusted to women, and for obvious reasons, wisely.

Are our schools doing their utmost to give mental strength to our children? The writer enters upon the consideration with some misgiving. Nevertheless, he has fault to find. Of the system of books he makes no complaint. The steps from simple to complex are many, gradual, and natural. But the demands made upon the pupil are arbitrary, excessive, and unnatural. The personality of the pupil is ignored. The class is a machine that is presumed to be able to do a certain amount of work, and so its task is set. The individual pupils are assumed to be parts, each perfectly fulfilling his function, in making a perfect whole. Now if all these parts had been made of the same material, had all been fashioned by the same wise and skillful hand, the expectation would not be extravagant. But such an assumption is so notoriously untrue, that it may seem unnecessary to state it, and yet class training proceeds upon the theory that it is true. Undoubtedly all brains can do some work, and so can all muscles, in a sound condition; but it is never safe to assume that either can do a given amount of work, until proven by individual experience. Class work takes no note of natural endowments. Class work takes no note of mental aptitudes. Class work takes no note of physical condition, but pushes all forward into the same column and demands of all the same day's work. No ambulances for the foot-sore — no stretchers for wounded brains — no light for dim eyes — no hints to beclouded minds — no better way to the uncertain, struggling brain; but all, shoulder to shoulder, must reach the same goal, at the same time, or sink by the way, humiliated and disgraced.

Such is not the way to break colts. Such is not the way to educate brains. But it is a most excellent way to disorganize, discourage and make them trifling, and of little worth. The object of education should be to make healthy, sturdy, robust, symmetrical persons, which cannot be done when the individual is subordinated to the class. Most, if not all, brains at times need help, which the present class system almost entirely ignores. It is not meant that natural aptitudes should be so regarded as to make them the foundation upon which education should be based. The object being strength, solidity and dexterity, it may be necessary to repress tendencies, and to stimulate and develop weak points. Aptitudes

will declare themselves, whether we will or no, in after life. But the aptitudes of some should not be made the standard of excellence for all. The class system must, under our system of education, in some measure continue; but its wrong tendencies can be largely mitigated or entirely remedied by an increase of instructors, so that the person will not be lost in the class. If it be urged that an increase of teachers demands increased expenditure of money, the statement may be doubted. Increased facilities would shorten the time of schooling necessary; but, if the expenditure of money should be more, can it be doubted that the fuller and more symmetrical development of the individual would be more than abundant compensation?

A very general opinion obtains that our children's brains are being overworked, and that their bodies are underworked. Neither opinion is well founded; indeed, there is little hazard in saying that the reverse of both opinions is true. Both minds and bodies enjoy certain kinds of activity. The body enjoys play; the mind enjoys a certain kind of intellectual vagrancy; and so both have a tendency to be busy in these ways, but neither enjoys persistent, coherent, useful work; and yet, such is the very kind of work that must be done to make useful men and women.

Children are not required to do too much intellectual work, but under the present system (the class) they are often required to lift impossible weights. Oft-repeated unsuccessful efforts to accomplish a given intellectual result will as surely injure the brain as unsuccessful efforts to lift a weight will injure a muscle. Hence, the imperative need of individual care. Doubtless, too much and too great a variety of work is often required to be done in a given time, but too much work, on the whole, is not required.

Special excitants, applied to the brain to induce it to accomplish its highest possible work, are of more than doubtful utility. This applies to the entire system in schools, high or low, of marks and prizes, honors and contests, whether at home or abroad. The system is pernicious in a variety of ways. It stimulates the delicate, active, highly organized brain to overwork, under the pressure of which some are injured and some break down. It engenders in those who win, self-confidence and expectations seldom realized in after life. Those who have made a vigorous struggle are humiliated, so that while few rejoice, many mourn; while the incapable or lazy

multitude, for whose advantage the contest was organized — whose brains, it was hoped, would be galvanized into life — soon discern their hopelessness in the race, and gallop over the course at an easy pace, quite satisfied to save their distance.' It is a contest to which after life furnishes no parallels. In the struggle of after life, you win because you advocate a better cause than I, or, because you are more diligent in business than I; but you never stand before me and say: "I will win because I am a better man than you."

"Inter-collegiate contests!" When shall we have organized an inter-collegiate contest of prayer? The blasphemy of the one is apparent. The evil effects and bad taste of the other ought to be equally apparent. If sports which are called manly, in which supremacy is the essential element, are of doubtful physical utility (and they are so regarded by most physicians), how much more doubtful is the contest of mind with mind; whose victory, and not a cause or a principle, is the essential element in the struggle. The morality of such a contest, the moralist is left to settle.

Children play too much, too long and too hard. A field of colts, where the companionship is constant, may be trusted to take care of themselves. The rivalry will not be too much for their healthful physical development; but he would be an unsuccessful breeder who should turn into his field a well fed, rampant colt, fresh from the stall, morning and evening, to excite the flock into greater activity, But children, in whom struggle for supremacy is one of the earliest manifestations, are supposed to be the better for an almost limitless amount of play, forgetting that their brains are too much for their bodies. And so they are left to bat and ball and shinny; to pull-away, and hide-and-seek, until, through exhaustion, they fall an easy prey to disease, which always stands ready to assault the weakest point of the physical citadel; and more, it may be safely stated, no exhausted body contains a rested mind. Severe physical and mental labor go not harmoniously together. Few can bear the strain of both. A physical and mental athlete is possible; they are not common; so that if we would obtain the best possible mental growth, we must not overtask the body. A verification of the above statement will come from any mother who has carefully watched the mental training of her own children.

It is not intended to undervalue air and exercise in maintaining

a healthful condition of body and mind. Nature's demand for both is imperative. In both growth and repair, it must ever be borne in mind that even the process of digestion is not completed when the food leaves the stomach—not completed when it reaches the blood—but must be laid down in bone and muscle and nerve; and this, to be perfected, requires absolute physical labor.

A practice obtains somewhat widely in our common schools, which, although pertaining more especially to the domain of morals, may be noticed in this paper. It may be called the system of self-crimination. The chiefs of the school establish a code or a system of rules. They are numerous; some of them are very high and some of them very low. The need of some of them is quite apparent; the need of others not quite so apparent; and unfortunately those that are not so apparent are the hardest to observe. A penalty attaches to the violation of each rule, and the pupil is required to report his own misdeeds, and is rarely allowed to cite extenuating circumstances. In this, the high court of school differs from all other earthly tribunals. The reason assigned for the requirement is, that it will cultivate in the pupil a high sense of honor. Now, doubtless, every human being should carefully police his own conduct, and yet, in making up his account for the day, he has a moral right to consider extenuating circumstances. This the child is denied, and he knows it is not fair play, and he mentally and morally revolts.

But this is not all, nor worst. The children will neither keep the rules nor report their violation; but, long before the years of school life are past, will begin slight prevarications, which is the highway to lying. The whole system may be fairly characterized as an ingeniously devised scheme to make liars of us all.

Proceeding to a more general consideration of mental hygiene, or health, it may be safely affirmed that no great possession will be employed to the utmost advantage of its possessor unless it be known and appreciated by its possessor. This statement is made with a full appreciation of the great endowment and perfection of instinct, with some reason superadded, if you will. No good dog says, I have great instinct or small reason. The conscious "I am," is the exclusive heritage of man and those above him. Conscious mind is his great inheritance. It is his only characteristic. It is his fortified citadel. It is his tower of strength. It is his inner

sanctuary. It is his holy of holies. Having the great possession, what shall he do with it? On the answer to this question, rests all that shall make him useful, and great, and good, or make him a curse to himself and mankind. If he answers this question wrongly, it were better for him had he never been born; and the answer rests largely with himself. In childhood and youth, the answer is mainly with others. In after life, he alone can answer it. The advantage flowing from a high appreciation and use of this great possession, all will admit. The evils following a bad use of them, all will admit. But to the evils consequent upon a disuse of this great gift, our eyes are only half open. It is safe to affirm that a large proportion of the ills of life come from a disuse, or misuse of this power; and yet every man holds in fee, what, if well employed, will make him richer than gold and happier than diamonds. Why has he not discovered and mined his own possessions? Because state-craft, and priest-craft, and caste-craft, and gold-craft would not have it so. An educated brain is a bad tool. It cuts the hand of him who attempts to wield it.

Civilization of necessity brings with it a certain amount of mental activity, but does not of necessity give large intellectual development. Unfortunately it puts within easy reach of the uneducated its vices; and the less the brain is developed the more alluring are those vices. The mental activity is generally carried into the vices to give them pungency and zest. The vice of intemperance would lose its relish, if its good-fellowship, its song and jest were eliminated from it. Take the social element out of drinking; compel a man to buy his own drink, as he would buy a box of matches, and go home; and in two years the evil will be nine-tenths cured. And it may be said generally, that a certain amount of intellectual activity enters into all of those social gatherings, which eventuate in worse than a waste of time. Mental activities once developed, clamor for food, and will have it; and if they are of a baser sort, will run on and on to the end. The same is true of all ignoble aptitudes and passions, unless met and checked by some sudden and powerful moral impulse.

Civilization lifts up her head in triumph, in the midst of her great achievements in science and art and literature, and glories chiefly in her noble charities, wherein science and humanity meet together and kiss each other; but bows her head in sorrow and

shame, as she contemplates her penal codes and her prisons. She does not seem to have considered that a condition of society is manifestly possible, when those great charities, and these great penitentiaries, may become almost unnecessary.

Our great republic boasts of her civil and political equality; but puts not forth the requisite effort to make them a blessing to herself or her children. Now, the only possible means through which political and social evils, including poverty and dissoluteness, and crime and sickness and insanity, can be reduced to their minimum, is through the mental development of the individual. The best methods to be employed to accomplish this result, it is not the purpose of this paper to discuss, but that it should be done, is an imperative necessity, if we would secure the highest welfare of the individual and of the state. It is just as necessary to the well-being of the individual that every faculty of his brain should be developed, as that his muscles should be put in motion. This may not be at all necessary to secure what is commonly called "success in life." A few sharpened faculties may pierce through many obstacles to the desired goals, but this will not, of necessity, make either a great or good man. A thoroughly educated and thoroughly dissolute or vicious man, if one can be found, will be an anomaly. The reason is obvious. He has grown appetites in other directions that demand food, and it takes all his time to forage for them.

It was said, in another part of this paper, that a large proportion of the evils of life come as a consequence of the disuse of mental faculties. That "a wise man foreseeth the evil and hideth himself," is as true to-day as when written, and so the question of the age is, How shall we be made wise? Parents guard the physical welfare of their children with jealous care, not that they may become stalwart, and so be able to thrash their neighbor's children; but that they may be able to resist the vicious elements in nature that surround them, and so grow up in the full physical enjoyment of life, and thus become useful members of society. So should it be in the education of our children; not to make their education a badge of distinction; not to relieve them of life's struggles, but to give them so goodly a heritage that they can rest at home, secure against the temptations that lead to unhappiness and dishonor.

It is sometimes said that higher education makes men impractical — that they do not succeed in life. Who is to decide what is

success in life? It is not likely the position can be maintained; but if it can, it is not the fault of education, but of the individual in whom it engenders unjustifiable expectations. He has put on his education as a badge of distinction, and so is distinguished for his folly. The remedy is in making higher education so common that it will cease to be a badge of distinction.

There is another feature of the subject properly belonging to mental health, upon which the writer enters with some hesitation; not because his suspicions of the truth of what he may say fall far short of profound conviction, but because he has not the statistics at hand to fully verify them, viz.: That insanity comes mainly as a consequence of disuse, instead of overuse of brains. Any careful observer who walks through the wards of a hospital for the insane, will be impressed with the apparent want of intellectual development of the great majority of its inmates; and on inquiry, he will find that the proportion of those not possessed with the rudiments of a common education is very large. He will also learn that the proportion of those tolerably well educated is very small; of those who enjoy books, still smaller, and of those whose mental discipline had at any time of life been thorough, very few indeed. Doctors and lawyers and preachers will be there, but to be either or all is not a sufficient guarantee of having had either a sound mental or moral training. But the inquirer will be more surprised when he learns the occupations of the great mass of inmates. The proportion of farmers is enormous. Indeed, farmers and housewives, and housekeepers and laborers furnish the great mass in many of our great hospitals. Of course the proportion varies as the agricultural or other interests obtain in different states and localities. But what is especially noticeable is this, that those avocations commonly understood to be, and which are in fact specially healthful, are furnishing so large a proportion of the insane; and this is still more remarkable when we reflect that insanity is now, almost without exception among specialists, believed to be a consequence of physical disorder. Statistics make the conclusion almost inevitable, that those avocations requiring the least intellectual development, although they are healthful, furnish more than their proportion of the insane. Even intellectual activity, in a limited number of directions, seems a partial bar to insanity. Even the poor sewing girls, whose daily toils press sorely upon their physical constitutions,

have a very small representation. Inventors, whose mental activities in given directions are intense, and their disappointments constant, have a very limited, or no representation; and it will appear through the entire list of occupations, that those which require the most mental strength and activity are least likely to break down. But if statistics should prove that the statement is not strictly true, it would not even weaken the other proposition, namely, that most of the insanity comes from disuse, and not overuse of brain power; for if a man goes into the competition of life, and risks his success upon the superior strength he may display in his little finger, and breaks it or paralyzes it, it is no proof that he would not have succeeded if he had used the strength of his whole body. The simple truth is, we march out into the thick battles of life without reserve corps or a base of supplies, and some of us are wounded, some crippled, and some annihilated. Our brains should be our base of supplies—our impregnable fortress. If they are not, then we have none.

But what shall we do with heredity? A large proportion of the insane have insane antecedents. Is heredity a hell-gate against which no power can be successfully projected? We do make successful war against heredity in other directions. If heredity had been an impregnable fortress, we should all be savages to-day. If we wound an arm, we put it in a sling, and use other members of the body until it rests itself well. The same physiological law holds good in relation to the brain. Every physician understands this law, and when his friends are overwhelmed by a great sorrow, gives them something to do, and something to think about, that the wounded spirit may have rest. Alienists understand it, and so object to isolating hospitals for the insane. They would locate them in close proximity to towns, where they can feed some faculties through eyes and ears, and so rest the disordered members through diversion; but, unfortunately, the great majority of the insane have no mental appetite—no mental stomachs have been grown that can digest food, and so they must be left to find their way out, or perish utterly.

The world has many schemes for securing the welfare and highest happiness of mankind. Some of them are formulated and enforced as panaceas. A formulated and enforced faith may have the power of momentum, but it will never secure personal development, good

conduct, or purity of heart in the mass of its adherents. If a dogmatic and coercive religion had been enough to secure the highest well being of the race, mankind would have been, long centuries ago, on the highway to the zenith of its power. It is not intended to undervalue the beneficence of religion upon mankind or the individual, especially of Christianity; for to deny its triumphs for good would be to falsify history and common observation.

Nor is it intended to deny that heights of moral grandeur are sometimes attained by the very ignorant, that stand forth a prophecy and hope to the race; but what is meant and insisted on is, that any formulated statement of religious or theological truth, the acceptance of which is made alike obligatory upon all minds and all consciences, plants in the very center of both mind and conscience vitiated seed that must in the end eventuate in partial loss of mental and moral health; and, more than this, all organizations, whether political or civil, whether social or religious, whether open or secret, that do not make the highest practical development of every individual soul their chief corner stone, will ultimately fail of good results, and the highest possible good.

FOODS AND DOMESTIC BEVERAGES.

BY O. G. SELDEN, M. D., TOMAH,

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The importance of taking such food, and only such, as is proper for us, will become manifest when we consider that our whole being is nourished by the ingestion of the nutritive principles of what we eat. Much also depends on the time and manner of taking food and the quantity taken at a given time; also, on the nutritive quality of the food itself. After adult age the quantity of food should compare as nearly as possible to the waste of the body; and for this reason the man of active habits will, all things being equal, require more food than those who live a sedentary life.

In this bustling age of ours, where the man of business grudges the expenditure of minutes as a miser does his pennies, many evil

results follow the practice of eating too fast. The food enters the stomach imperfectly masticated, the digestive forces are overtaxed, and if persisted in, such a course must lead to such derangement of health and the proper nutrition of the body as follow a dyspeptic habit of the system. I say *habit*, because a long experience has taught me that most dyspeptics can be restored to health by establishing a proper time and manner of taking their daily food. This haste in eating should be guarded against at all times, and no portion of food, of whatever kind, should ever enter the stomach until it is perfectly masticated.

Many, nay, most, people eat too much. The hasty eater is especially liable to fall into this error. The sensation of hunger does not depend on any peculiar condition of the digestive organs, as was formerly supposed, but by the demand of the whole animal organism, when its supply of nutrition is exhausted. The hasty eater entirely ignores this fact, practically, and by rapidly filling the stomach with improperly masticated food, arises often from the table with a feeling of oppression and fullness of the stomach, which distress would have been avoided if he had spent a few more minutes in taking his meal. Dr. Benj. Franklin, who was, when young, a great bustler, and placed an exaggerated value on time, says a man should arise from the dinner table with a good appetite, a rule applicable to most cases, but not to all. I would not be thought as encouraging a needless waste of time in eating or in anything else, but that man must but poorly improve his hours of business or labor who cannot spare half an hour in which to take his every meal.

The common practice for adult persons in health is to take food three times each day — morning, noon and evening. This division of the periods of taking food is probably as good as any that can be suggested. But this stated period should be the *only* time of taking food. The pernicious practice of eating between meals, so common to most people, is greatly to be deplored. It leads to overtaxing the digestive forces, and brings on eventually much suffering and derangement of health. All food, of whatever kind, should be taken at the regular periods of eating — even fruits, pastries and sweetmeats. Any healthy stomach will contain and digest enough food to nourish the body, if taken at the ordinary periods — beyond this, all is useless and productive of harm. It should ever

be borne in mind that we eat and drink in order to live, because it is a law of our nature, not that we live to eat and drink.

Of the kind of food best for the nourishment of our human organism, we propose to treat in the present paper, not only that which will, so far as it goes, be most likely to preserve us in health, but that which will tend to develop the highest type of the physical man. The kind of food required by any particular animal is determined by the peculiar form of the masticating organs of the said animal. The carnivora, as the dog, cat, etc., have teeth suited only for eating flesh, and herbs and grains would be entirely unsuited to their nutrition. Other animals, as the ox and sheep, have teeth fitted only for the proper mastication of grasses, herbs, and other vegetable products. The rule we have given, that is, "that the proper food for any species of animal is determined by the form of its masticating organs," is of such universal application, and of such rare exception, that upon it has been based a department of natural science called Paleontology. To those skilled in this branch of science, it is only necessary to examine the teeth of an animal, and its food and many of its habits become apparent at once. The accuracy of the methods of this science is such that the fossil remains of many extinct species of animals are sufficient indicators of their habits and mode of life, and by this means much accurate knowledge of prehistoric animals and even of the condition of the earth in times when they existed, has been developed in our day.

Following this rule of the naturalist, we observe that man is designed to be nourished by various kinds of food. The peculiar construction of his teeth adapts him to eating flesh, vegetables, fruits, grains and farinaceous substances — he is in fact omniverous. That he is designed to live on various and in many cases dissimilar foods, that these are necessary to preserve his health, and to fully develop his physical being is a truism which the experience of ages has established. It is also observed that many peoples who have for ages lived on coarse and insufficient food have degenerated from generation to generation until perfect physical development is almost unknown among them. They become stunted in stature, coarse in feature, and lacking the intellectual force and physical activity which marks the character of more favored nations. That this is true of the lower classes of many European nations every

day observation teaches us. We have seen something of this in our own country among people who call themselves "vegetarians." The writer has lived where he could carefully observe such persons, and truth compels him to say that he has never seen a firm, elastic step, or a fresh, healthy countenance among them. Pale, languid, apathetic, sickly looking creatures, were the rule.

Much has been said concerning the beneficial effect of exclusively vegetarian diet among students and those who must daily do severe mental labor. The idea is a most mistaken one, for if the brain labors assiduously, it needs the same nourishment as other organs of the body when undergoing severe exercise. We have seen the result of the vegetarian system in the enfeebled health and ruined hopes of many promising students. If the student will take heed to the physical law of his nature — take the food nature designed him to have, and plenty of free exercise in the open air — he will find no use for a vegetarian diet. In the selection of proper food, each species of the brute creation is guided by the unerring instinct of its kind. We never hear of a dog eating grass or hay, or of a cow eating flesh. Perhaps the wants of their nature, or some peculiar sensation of hunger, is the guide by which they are directed. With man, however, food is the subject of experience, reason and scientific research.

In early infancy, before the teeth are developed, nature provides for us the simplest form of animal food in the milk of the mother. The principal nutritive qualities contained in milk are butter or fat, casein or cheesy matter and sugar. Human milk is not only more nutritive but more easy of digestion than cow's milk, because it contains, in proportion to the whole quantity, more butter and sugar and less casein. This latter principle is not a proximate principle, but must undergo digestion before it is available for purposes of nutrition. In case of infants who are deprived of their natural nutriment, we should endeavor to provide something as nearly resembling human milk as possible. The following is perhaps the best that has yet been suggested. The milk of a fresh cow should be allowed to stand in a vessel as deep as broad, for about three or four hours, when about one-third of the upper portion should be dipped off (not poured). Add to this when dipped off an equal quantity of warm water, and put in refined sugar until it becomes perceptible to the taste. This will most nearly resemble human

milk and is consequently most fit for the food of the infant when in health. When the teeth are developed and the child has acquired the use of its locomotive organs and taken on the active habits of that period of life, a more varied and substantial aliment becomes necessary. To this new necessity of the human being, both the animal and vegetable kingdoms of nature become tributary. Many of the most important nutritive principles are in common contained in both animal and vegetable food, and although found in unlike forms and under different circumstances, differ from each other very slightly or not at all.

We have heretofore spoken of the evident design of the Creator that our human organism should be nourished and supported by a variety of edible substances. This has been established by actual experiment, which proves that no single article of diet can supply all the material for the regeneration of the physical man. The healthy appetite indicates that a varied diet is necessary. This fact is also exemplified in long sea voyages, and in the march of large armies into an enemy's country, when from necessity the requisite variety of food is not obtainable. Analytical chemistry fails to show why this change of aliment is necessary, or in what the deficiency in a single kind of diet consists, but it is a truth taught us by experience that when we have for a time been confined to a particular diet, it loses the power of nourishing our bodies, and a supply of other material is demanded. This fact is often shown when the diet consists largely of salted meats, though it is equally true when we are confined to the use of a single kind of fresh meat. After a long confinement to a restricted diet as regards variety, a supply of other material becomes necessary, otherwise the defective nutrition manifests itself in many forms of diseased action, principally in what is called "scurvy."

It is thus apparent that a proper quantity, or even quality, of food is not all that is required for healthy nutrition and development, but that our nature requires also a variety. Fresh vegetables and fruits should be used at proper times. This was frequently proven during the late war. Often in hospitals where the diet was of necessity wanting in variety, there was an almost universal craving for raw potatoes and onions, and the writer has seen the condition of the wounds changed for the better in a whole hospital when it became possible to supply the patients with a proper vari-

ety of food. It therefore becomes a question of great responsibility to those who have the task of providing subsistence for large bodies of men that the needed variety should not be overlooked.

The principle of variety in food has been found to apply also to the lower order of animals. Burdach tells us that rabbits will not bear a restricted diet. Three young rabbits from the same litter were experimented on. One, fed on potatoes alone, died on the thirteenth day, and one, fed on barley alone, died in the fourth week, while a third was fed on potatoes and barley alternately every other day for three weeks and afterwards by the same articles given together, and it grew and developed into a healthy, vigorous animal.

The quantity of food necessary for a human being is so variable that no rule can apply to all, and any effort in this direction must be regarded as a mere approximation. This depends on the habits of the individual, on his age and peculiar physical conformation. Men who perform great physical labor need more food than those who do not, and as a rule it has been observed that persons of a lean habit of body eat more than those who are fleshy. In the early periods of life also more food is needed in proportion than in adult life, because by supplying the natural waste of the body a certain amount is needed for its growth and development. Then in very cold climates a much larger amount of aliment is necessary to preserve health than in more temperate localities. Dr. Kane relates that during a winter of intense cold, which he with his men spent in the Arctic regions, each man would consume eight eider ducks and from three to five pounds of rice per day, besides his ordinary sailor's ration. He further says that from his personal observation the daily ration of the Esquimau is from twelve to fifteen pounds of flesh, one-third of which is fat. He once saw an Esquimau eat at a single meal ten pounds of walrus flesh and blubber. A Russian officer tells us that he once saw a man eat at a single meal a quantity of rice and butter that weighed twenty pounds. The writer remembers a blacksmith whom he knew in early life, who was a huge feeder, and whom he once heard remark that he had never yet taken sufficient food at a single meal to satisfy his appetite. This man was rather spare in flesh, but had a fine development, a great capacity for labor, and was endowed with extraordinary physical strength.

Perhaps the healthy appetite is the best guide to the quantity of food necessary for the sustenance of the individual, and under proper restraint and restricted by sound common sense, no better rule can be given. It is perhaps only necessary that human beings should avoid substances that are known to be destitute of nutritive principles, and which are sometimes eaten to gratify the promptings of a morbid longing for something. We will now pass in review some of the more important articles of food, and what are thought to be the best methods of preparing them for the purposes of nutrition.

At the head of this class stand the different kinds of meats, a name generally given to the flesh of the herb-eating mammalia. The flesh of this variety of animals, although not of all of them, is considered fit for food. The flesh of the horse, of rats, and many others, is excluded from the table in civilized countries. Attempts which have found favor with some scientific men have been made to introduce the flesh of the horse into use, and give it a place among the edible meats. Although horseflesh is probably still consumed under other names in spite of the prejudice against it, the experiment may be pronounced a failure. It seems to be insufficient to supply the necessities of our organism, and is, we believe, not now openly exhibited for sale in the provision markets of any civilized country. Also dogs, rats, cats and mice, have long been used in the large cities of China as food, yet even here they are mostly sold or prepared into mixed dishes under an assumed name.

Instinctively mankind generally prefer beef, and experience has taught that this article can be used more constantly than any other of its class. This is undoubtedly because it is composed of principles that, taken together, more completely supply the demands of our organism than any other meat. It is a notable fact that when used constantly, no articles of food so soon lose their relish as those which, when taken occasionally, are considered as delicacies, such as venison or any variety of game. Most people can realize that it would be hardly possible to live on any variety of game for three months, and yet many persons live on beef for years, and do not lose the appetite for it. For this and many other reasons it may be laid down as a rule that beef is the most digestible of all kinds of meat, and its influence on the nutrition of the body most favorable. It is perhaps unnecessary to say that the animal taken for

beef should be of mature age, in good health and well nourished, and that the animal should be slaughtered some little time before the beef is used.

As beef is to be considered as the type of meat food, we will here give a chemical analysis of it furnished by Berzelius:

Water.....	77.17
Muscular tissue.....	15.80
Tenacious tissue.....	1.91
Albumen.....	2.20
Substances soluble in water.....	1.04
Substances soluble in alcohol.....	1.80
Phosphate of lime.....	.08
	<hr/>
	100.00
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Next to beef as an agreeable and nutritive meat stands mutton. So far as its nutritive properties are concerned it would perhaps be difficult to say that it is inferior to beef, yet there are few persons who can take it for any length of time without acquiring a distaste for it, a fact that should teach us that it does not supply that variety of alimentary matter which we so imperatively demand.

Pork is most commonly used after it has been preserved by salting or smoking; but when used fresh, if thoroughly and properly cooked, it is a very agreeable and highly nutritious article of food. The taste will not tolerate fresh pork as long as it will cured hams, bacon, shoulders, etc. It should be borne in mind that pork sometimes contains the *trichina spiralis*, and when taken into the stomach deficiently cooked, these parasites sometimes find their way into the muscles and produce serious disease and sometimes death. Pork so infested is said to be measly, and may be detected by its general appearance, or by microscopic examination, or by the peculiar crackling noise emitted during the process of roasting or broiling. As a matter of precaution, pork should never be used until it is very thoroughly cooked.

The flesh of many non-domesticated animals is, in our climate, used as food, as that of the bison, the different varieties of deer, the bear, the raccoon, the rabbit and the squirrel. The flesh of these animals is, in some instances, highly flavored and nutritious, but when constantly used for a time becomes distasteful, and finally, if persisted in, absolutely repulsive. In nutritive qualities all are much inferior to beef. The same may be said of the flesh of the bird family, whether domesticated or wild, as the fowl, turkey,

goose, duck, swan, pigeon, quail, prairie chicken, grouse, and many others. Poultry, as a rule, is palatable and easy of digestion, but the game birds are very decidedly flavored, and soon become distasteful if used as food too constantly.

We have heretofore spoken of the animal products, eggs, milk, butter and cheese, and the limits of this essay forbid further mention of the subject than to say that each plays an important part in the perfect nutrition. We remark, with regard to eggs, that when they are partially cooked they are much more digestible than when rendered solid by long boiling. With regard to milk, we remark that the animal producing it should be fed, if possible, on fresh vegetable food adapted to its highest nutrition; should be kept in good flesh, and during winter, should be kept in a clean stall and have plenty of exercise in the open air, with water often given, and, if possible, either turnips, potatoes, carrots or rutabagas, at least once every day.

Besides the meat foods already mentioned, the edible portions of many fishes, reptiles, mollusks and crustacea are used as food. The flesh of all fishes requires to be very thoroughly cooked, when it becomes tolerably nutrient and agreeable. Salted fish, however, are almost destitute of nutritive qualities, these principles having been almost entirely taken up by the salt in which they have been preserved. Of the reptile tribe, the green turtle and salt water terrapin are largely used by the seaside restaurants in making soups. The flesh of the turtle, when cooked, bears a close resemblance to veal. Of the mollusks, the most used as food are the oyster and some varieties of clams. The best American oysters are large enough to be cooked in a variety of ways, and their flavor, when developed by cooking, is superior to that of any in the world. The crustacea are better known as shell-fish, and are mostly used as articles of luxury. They include lobsters, crabs and shrimps. As a rule, their flesh, though said to be nutritive, is very difficult of digestion.

In the preparation of most kinds of animal food, roasting and broiling are the simplest and most rational means, and are essentially the same in their operation. By these means the outside of the flesh becomes first hardened, and prevents the escape of the juices and nutritive substances as well as the flavor, during the further process of thorough cooking. Many meats are well prepared

by boiling, when the object is to cook thoroughly and to extract as little of their juices as possible. In boiling, however, the meat should be put into cold water and heat applied afterward. Stewing is a process by which meats are made very tender, and the juices which are extracted are preserved in the gravy. Frying is universally disapproved as the worst possible way of preparing meat. The very high temperature to which meat is exposed by this process, greatly impairs its nutritive properties. When meats are prepared in this way, they should be covered by crumbs or batter, which, to some extent, prevent the injurious action of the process.

It is unnecessary to discuss the methods employed in preparing mollusks, crustacea, etc., which are generally regarded as articles of luxury, and a consideration of condiments, spices, etc., and various vegetable articles used in refined cooking would be out of place, as they refer chiefly to the taste and have no direct bearing on nutrition. Before, however, leaving the subject of animal foods and their preparation, we will briefly refer to a very important physiological subject, with regard to the principles which are extracted from various meats by prolonged boiling, and the best method of making a nutritious and economical soup. Soups are very largely consumed by all classes of community, and when properly prepared are quite nutritive, so much so as to be a matter of wonder when we consider the small amount of solid matter which they contain; the proportion of solid matter not being more than nine or ten parts per thousand. In making soups, various vegetables are added, which, beside flavoring them, supply a certain quantity of nutritive matter. As the type of all soups, we will give the manner of preparing the celebrated "*bouillon*" of French *cuisine*.

Take of water.....	20 gallons.
Take of meat with the bones.....	68 lbs. 10 oz.
Take of vegetables	13 lbs. 10 oz.
Take of salt.....	1 lb. 12 $\frac{3}{4}$ oz.
Take of burnt onions.....	7 $\frac{3}{4}$ oz.

The meat should be cut off from the bones and tied with strong cords in packages of nine or ten lbs. each, and the bones broken up and placed in the bottom of the kettle. The meat should then be placed upon a grating, or perforated false bottom, above the bones. Twenty gallons of water are then poured in, when the whole is raised to the boiling point, and the scum removed as it

forms. It is kept gently boiling for two hours, during which time it is constantly skimmed. Between the first and second hour, when the skimming is nearly completed, the vegetables, with the burnt onions are put in, enclosed in a net bag. A gentle boiling is then maintained for four or five hours. The fire is then extinguished, and after an hour the vegetables, the meat and the bouillon are taken out. When the latter is to be used, the congealed fat is to be taken from the top, and the bouillon mixed with an equal quantity of water to make soup.

It now remains to treat of the cereals particularly, and the kinds of aliment prepared from them, especially bread. The cereal grains proper for food of the human race are wheat, maize or Indian corn, rye, buckwheat, oats, barley and rice. Except rice and barley, these are generally ground into flour or meal, freed from the bran, and made into bread, cakes, gruel or porridge. These preparations are all more or less important as nutritive substances. But wheaten flour is the only preparation made from the cereals capable of making that most important of all alimentary articles, good bread. It is true that bread may be made from corn, rye and barley, and they are all more or less nutritive; but corn bread, which is largely used by the people of our Southern States, and is highly nutritive on account of the large proportion of oily matter which it contains, is apt to cause derangement of the stomach in persons not accustomed to its use, especially when not carefully prepared. In the large cities of the civilized world, corn is not a very important article of diet.

Rye is sometimes used in place of wheat because of its cheapness, and it makes tolerable bread, but it cannot take the place of wheat as an aliment. In composition, it differs from wheat in containing less nitrogenized matter and more dextrine and sugar. The composition of buckwheat is nearly the same as rye, but it contains less dextrine and sugar. Principally in this country, it is used in making baked cakes, which are highly esteemed by many. In some of the poorer sections of the old world the flour is mixed with wheat flour in making bread, but only on account of its cheapness, as it does not improve the flavor of the bread, and, as a nutritive article is very much inferior. Oats contain a large portion of oily matter, and are largely used as an aliment in Scotland, and in the northern counties of England. The oatmeal cakes so common in

Scotland almost invariably produce derangements of digestion in persons not used to them. It has been also remarked that acidity of the stomach, and what is called "water-brash," is more common among the lower classes in Scotland than any other part of the world. Barley is not an important article of diet. It is sometimes dried by a peculiar process and sold in the markets as an aliment, under the name of "pearled barley." It is not very nutritious, but used therapeutically, affords an agreeable demulcent drink called barley water. It is also sometimes made into puddings, and used at meals as a dessert.

Rice is noted among the cereals for containing a very large proportion of starch, reaching nearly to ninety per cent. Millions of people in Eastern countries are said to subsist almost solely upon it. Where it constitutes so large a proportion of the daily food, it is consumed in enormous quantities. Its influence upon the people who are dependent solely upon it for food is remarkable, for they lack the robust, healthy, physical development common to nations who use a mixed diet. In civilized countries, it is not a very important article of diet.

We come now to the further consideration of that most important of all articles of food, either animal or vegetable, appropriately denominated the "staff of life," because it presents such an admirable combination of all alimentary principles as causes it to be accepted as the prime article of diet in all civilized countries. It rarely becomes distasteful from monotony if properly mixed with other kinds of food, and this alone demonstrates how completely it meets the demands of the human system. There are few questions connected with alimentation of greater importance than the making of *good wheat bread*. In bread-making we may safely adopt the French method which is said to furnish the best bread in the world. Most assuredly the first step toward making good bread is, to have good flour. The best flour is said to be obtained from the hard grains, and in the production of this class of cereals, this country is not surpassed. The first step in bread-making is to mix one hundred parts of flour with fifty to sixty, by weight, of water, and add to every ten pounds of the mixture half an ounce of fresh yeast, with a little salt; some bakers add a little potato or alum, but, although not injurious, these latter substances must be regarded as adulterations. The mass is then kneaded until it forms a homogen-

eous dough when it becomes so tenacious and elastic that the surface will not be broken by the gas, to be generated in the interior. Then dividing it into loaves it is set aside from six to eight hours in a temperature of 80° to 100° Fahrenheit, to "rise." Some chemical changes take place during the rising of the bread, which have been called "panification," in which process some of the natural alimentary substances are transformed into compounds, and gases are eliminated, and in this way the dough is raised by the formation of little cavities in it, and given its porous character which becomes fixed in the process of baking. When the dough is sufficiently raised, it is put into the oven and baked. Heat at first increases the development of gas, but when the temperature reaches 212° Fahr., the process of fermentation is arrested and the process of baking being continued, the dough is fixed in its expanded condition, the alcohol generated during fermentation being driven off by the heat. The outside parts of the loaf are exposed to a temperature of about 375° and become hardened, forming the crust which contains more soluble matter than the interior. The inside of the loaf does not acquire a temperature much above 212°. Acidulous fermentation takes place to a limited extent even in fine white bread, but must not be allowed to proceed too far, otherwise the bread will become sour and indigestible. Bread should not be eaten warm, but allowed to become "stale," as then it is more easily digested. Various kinds of brown bread are made from grains differently prepared, but as an article of diet they are all inferior to good *wheat bread*. Notwithstanding the great value of bread as an article of diet, and admirably adapted as it is to the wants of the physical man, it is doubtful if he can, for any length of time, subsist on that alone. It comes to us on the authority of a young English physician that Dr. B. Franklin, when a journeyman printer, had lived for two weeks on bread and water alone, that he consumed ten pounds of bread per week and found himself at the end of that time well nourished and in good health. This same young Englishman himself fell a victim to ill-judged experiments on his own person, of the effects of different kinds of food. He lived forty-four days on bread and water, twenty-nine days on bread, sugar and water, and twenty-four days on bread, water and olive oil, when his constitution gave way and he died from the effects of his own experiments. The impossibility of sustaining the human

frame on bread alone has so far been recognized in Christian lands that the old punishment of confinement on bread and water is fast becoming expunged from the criminal laws of the civilized world.

Certain leguminous roots are largely consumed as food, and of these the common potato is by far the most important. It forms a larger part of our food than any other vegetable product except wheat, and of all vegetables, is the one that becomes least distasteful from continued use. It forms a very large part of the food of the poorer classes in Ireland and Germany; but those who are too closely confined to it are not well nourished. The best method of preparing the potato is by boiling or baking, when its substance becomes softened by the disintegration of the starch granules which it so largely contains. Important as it is as an article of food, the study of its qualities shows that it cannot maintain our organism in full vigor, as it is deficient in many principles which our nutrition imperatively demands. The sweet potato and beet root are also largely used as food and supply many wants of the body. Also parsnips, salsify, carrots, onions, and garlies supply us with vegetables more or less nutritious. These articles are craved when the system is suffering from a deficiency of vegetable food. Many green leaves and leaf-stalks, as cabbage, cauliflower, lettuce, celery, chicory, cresses, etc., are not used as food but chiefly as articles of luxury. *Sauer-Kraut*, so largely used in Germany, is made by packing cabbage with salt under heavy pressure and allowing it to stand until acetous fermentation takes place, when it is stewed and eaten with meats. Of the edible leguminous seeds, beans, and peas are most important. When dried they constitute an important part of army rations. Though inferior to the cereals, they are considered highly nutritious, for they contain a large amount of nutritive principles.

Ripe fruits are largely eaten as articles of luxury and contribute to the variety of food, but they are not very important as alimentary substances. The various melons are very grateful and refreshing, but they contain a very small amount of nutritive matter.

The refinements of modern cookery require a large number of articles, which cannot be considered as alimentary substances. Pepper, capsicum, vinegar, mustard, spices, and articles of this class have no decided influence on nutrition except as they promote the secretion of the digestive fluids. Common salt has indeed been

said to be a nutritive principle, for it is known that no animal can be well nourished without it, and it exists naturally in many edible meats and vegetables.

OF DOMESTIC BEVERAGES.

Under this head we will consider coffee, tea, and chocolate. Water, which may be considered a principle of nutrition, is taken into the system not only as a drink, but exists largely as a constant constituent part of every alimentary substance, at least when prepared as food. Pure water does not exist in nature. Even rain water contains certain substances in solution. The Croton water supplied to the city of New York, contains 4.16 grains of solid matters to the gallon.

Coffee is an article daily consumed by many millions of people in all parts of the world. In armies, it enables men on scanty rations to perform an amount of labor that would be impossible under other circumstances. After exhausting efforts of any kind, no food or drink relieves the overpowering sense of fatigue so completely as coffee. If my reader has been an army surgeon he will remember some instance where men were marched until when halted they laid themselves down in the mud or on the frozen ground until coffee was made, when every man received his pint, drank it, and perhaps marched ten miles further. At night, after severe duty, the first desire of the soldier is for coffee, hot or cold, with or without sugar, the only essential being a sufficient quantity and a pure article. Except in persons who, from some constitutional peculiarity are unpleasantly affected by it, the importance of coffee as an aliment or as a substitute for scarcity of food is apparent. Almost every one can testify to the effect of coffee in increasing his capacity for labor, especially mental, by producing wakefulness and clearness of intellectual perception. Habitual use makes coffee almost a necessity even to those who are otherwise well nourished and subject to no excessive labor. It is said that when taken in large quantities it produces persistent wakefulness, and that it is often taken to prevent the desire to sleep. It has been shown by experiment that the use of coffee permits the reduction of food much below the standard which would otherwise be required to maintain the organism in a proper condition. Dr. Hayes, the Arctic explorer, bears testimony to the beneficial effect of coffee on ex-

posed and over-taxed men, and says its influence was much superior to alcoholic stimulants. These facts are important, for there could be no better test of the value of this beverage than in men subjected to intense cold and great hardships. Coffee is prepared for use by roasting, a process that is called "torrification," before it is made into an infusion. The roasting should be made slowly and continued until the grains acquire a chestnut-brown color. During this process the grains are considerably swollen and they lose about sixteen per cent. of their weight; also develop a peculiar aromatic principle. The roasting must not be pushed too far or the agreeable flavor will be lost, and a bitter, acrid taste will result. An infusion of fifteen hundred grains by weight, of roasted and ground coffee in a quart of boiling water, made after the French manner by simple percolation, is the best method of making the beverage. There are numerous varieties of coffee, but the best in the market is the Arabian Mocha. In the countries where coffee is grown, the leaves of the shrub are roasted and made into a beverage as we use the berry. The effects on the system are the same, and the natives are said to prefer the leaves to the berry.

The dried and prepared leaves of the tea-plant made into an infusion are probably as extensively used as coffee, taking into account the enormous quantity used in the countries where it is grown. Its effects are almost the same as coffee, in fact the active principle of the two substances has been found to be chemically identical.

Two kinds of tea are found in our markets; the green and black teas. The manner of their production is somewhat of a mystery; whether they are the product of the same plant taken off at different periods of their growth, or whether they are grown on two distinct species of plants, is not known with certainty. The black tea is the stronger, yielding about three per cent. more soluble matter than the green. Tea is prepared for drinking by rapidly making an infusion with hot water; boiling destroys the aroma. Three hundred grains to a quart of water is the best proportion. The leaves are first covered with boiling water and are allowed to "steep" for ten or fifteen minutes in a warm place, when boiling water is added to the quantity desired.

Chocolate is made from the seeds of the cocoa tree, roasted, deprived of their husks and ground with warm rollers into a pasty mass with sugar, flavoring substances being sometimes added. It

is then made into cakes, cut into small pieces or scraped into powder and boiled with milk or milk and sugar and water, when it forms a thick drink like gruel which is highly nutritive, and has some of the physiological effects of tea and coffee. Taken with a little bread it readily relieves hunger, but its stimulant qualities are slight compared with these latter beverages.

ADDRESSES AND MISCELLANEOUS PAPERS.

CENTENNIAL ADDRESS.

WHAT THE AGE OWES TO AMERICA.

BY HON. WM. M. EVARTS.

[Delivered at Philadelphia July 4, 1876.]

The event which to-day we commemorate supplies its own reflections and enthusiasms and brings its own plaudits. They do not at all hang on the voice of the speaker, nor do they greatly depend upon the contacts and associations of the place. The Declaration of American Independence was, when it occurred, a capital transaction in human affairs; as such it has kept its place in history; as such it will maintain itself while human interest in human institutions shall endure. The scene and the actors, for their profound impression upon the world, at the time and ever since, have owed nothing to dramatic effects, nothing to epical exaggerations. To the eye there was nothing wonderful, or vast, or splendid, or pathetic in the movement or the display. Imagination or art can give no sensible grace or decoration to the persons, the place, or the performance which made up the business of that day. The worth and force that belong to the agents and the action rest wholly on the wisdom, the courage, and the faith that formed and executed the great design, and the potency and permanence of its operation upon the affairs of the world which, as foreseen and legitimate consequences, followed. The dignity of the act is the deliberate, circumspect, open and serene performance by these men in the clear light of day, and by a concurrent purpose, of a civic duty, which

embraced the greatest hazards to themselves and to all the people from whom they held this disputed discretion, but which, to their sober judgments, promised benefits to that people and their posterity, from generation to generation, exceeding these hazards and commensurate with its own fitness. The question of their conduct is to be measured by the actual weight and pressure of the manifold considerations which surrounded the subject before them, and by the abundant evidence that they comprehended their vastness and variety. By a voluntary and responsible choice they willed to do what was done, and what without their will would not have been done. Thus estimated, the illustrious act covers all who participated in it with its own renown, and makes them forever conspicuous among men, as it is forever famous among events. And thus the signers of the Declaration of our Independence, "wrote their names where all nations should behold them, and all time should not efface them." It was, "in the course of human events," intrusted to them to determine whether the fullness of time had come when a nation should be born in a day. They declared the independence of a new nation in the sense in which men declare emancipation or declare war; the declaration created what was declared.

Famous, always, among men, are the founders of states, and fortunate above all others in such fame are these, our fathers, whose combined wisdom and courage began the great structure of our national existence, and laid sure the foundations of liberty and justice on which it rests. Fortunate, first, in the clearness of their title and in the world's acceptance of their rightful claim. Fortunate, next, in the enduring magnitude of the state they founded and the beneficence of its protection of the vast interests of human life and happiness which have here had their home. Fortunate, again, in the admiring imitation of their work, which the institutions of the most powerful and most advanced nations more and more exhibit; and, last of all, fortunate in the full demonstration of our later time that their work is adequate to withstand the most disastrous storms of human fortunes, and survive unwrecked, unshaken, and unharmed.

This day has now been celebrated by a great people, at each recurrence of its anniversary, for a hundred years, with every form of ostentatious joy, with every demonstration of respect and gratitude for the ancestral virtue which gave it its glory, and with the firmest

faith that growing time should neither obscure its luster nor reduce the ardor or discredit the sincerity of its observance. A reverent spirit has explored the lives of the men who took part in the great transaction; has unfolded their characters and exhibited to an admiring posterity the purity of their motives; the sagacity, the bravery, the fortitude, the perseverance which marked their conduct, and which secured the prosperity and permanence of their work.

GRANDEUR OF THE WORK OF 1876.

Philosophy has divined the secrets of all this power, and eloquence emblazoned the magnificence of all its results. The heroic war which fought out the acquiescence of the Old World in the independence of the New; the manifold and masterly forms of noble character and of patient and serene wisdom which the great influences of the times begat; the large and splendid scale on which these elevated purposes were wrought out, and the majestic proportions to which they have been filled up; the unended line of eventful progress, casting ever backward a flood of light upon the sources of the original energy, and ever forward a promise and a prophecy of unexhausted power — all these have been made familiar to our people by the genius and the devotion of historians and orators. The greatest statesmen of the Old World for this same period of one hundred years have traced the initial steps in these events, looked into the nature of the institutions thus founded, weighed by the Old World wisdom, and measured by recorded experience, the probable fortunes of this new adventure on an unknown sea. This circumspect and searching survey of our wide field of political and social experiment, no doubt, has brought them a diversity of judgment as to the past, and of expectation as to the future. But of the magnitude and the novelty and the power of the forces set at work by the event we commemorate, no competent authorities have ever greatly differed. The contemporary judgment of Burke is scarcely an overstatement of the European opinion of the immense import of American independence. He declared: "A great revolution has happened — a revolution made, not by chopping and changing of power in any of the existing states, but by the appearance of a new state, of a new species, in a new part of the globe. It has made as great a change in all the relations and balances and

gravitations of power as the appearance of a new planet would in the system of the solar world.”

It is easy to understand that the rupture between the colonies and the mother country might have worked a result of political independence that would have involved no such mighty consequences as are here so strongly announced by the most philosophic statesman of his age. The resistance of the colonies, which came to a head in the revolt, was led in the name and for the maintenance of the liberties of Englishmen, against parliamentary usurpation and a subversion of the British constitution. A triumph of those liberties might have ended in an emancipation from the rule of the English parliament, and a continued submission to the scheme and system of the British monarchy, with an American parliament adjusted thereto, upon the true principles of the English constitution. Whether this new political establishment should have maintained loyalty to the British sovereign, or should have been organized under a crown and throne of its own, the transaction would, then, have had no other importance than such as belongs to a dismemberment of existing empire, but with preservation of existing institutions. There would have been, to be sure, a “new state,” but not “of a new species,” and that it was “in a new part of the globe” would have gone far to make the dismemberment but a temporary and circumstantial disturbance in the old order of things. Indeed, the solidity and perpetuity of that order might have been greatly confirmed by this propagation of the model of the European monarchies on the boundless regions of this continent. It is precisely here that the Declaration of Independence has its immense importance. As a civil act, and by the people’s decree — and not by the achievement of the army, or through military motives — at the first stage of the conflict it assigned a new nationality, with its own institutions, as the civilly preordained end to be fought for and secured. It did not leave it to be an after-fruit of triumphant war, shaped and measured by military power, and conferred by the army on the people. This assured at the outset the supremacy of civil over military authority, the subordination of the army to the unarmed people. This deliberative choice of the scope and goal of the Revolution made sure of two things, which must have been always greatly in doubt, if military reasons and events had held the mastery over the civil power. The first was, that nothing less than the

independence of the nation, and its separation from the system of Europe, would be attained if our arms were prosperous; and the second, that the new nation would always be the mistress of its own institutions. This might not have been its fate had a triumphant army won the prize of independence, not as a task set for it by the people, and done in its service, but by its own might, and held by its own title, and so to be shaped and dealt with by its own will.

OBJECTS OF THE REVOLUTION.

There is the best reason to think that the congress which declared our independence gave its chief solicitude, not to the hazards of military failure, not to the chance of miscarriage in the project of separation from England, but to the grave responsibility of the military success — of which they made no doubt — and as to what should replace, as government to the new nation, the monarchy of England, which they considered as gone to them forever from the date of the declaration.

Nor did this congress feel any uncertainty, either in disposition or expectation, that the natural and necessary result would preclude the formation of the new government out of any other materials than such as were to be found in society as established on this side of the Atlantic. These materials they foresaw were capable of, and would tolerate, only such political establishment as would maintain and perpetuate the equality and liberty always enjoyed in the several colonial communities.

But all these limitations upon what was possible still left a large range of anxiety as to what was probable, and might become actual. One thing was too essential to be left uncertain, and the founders of this nation determined that there never should be a moment when the several communities of the different colonies should lose the character of component parts of one nation. By their plantation and growth up to the day of the Declaration of Independence they were subjects of one sovereignty, bound together in one political connection, parts of one country, under one constitution, with one destiny. Accordingly the declaration, by its very terms, made the act of separation a dissolving by "one people" of "the political bands that have connected them with another," and the proclamation of the right and of the fact of independent nationality was,

“that these United Colonies are, and of right ought to be, free and independent States.”

It was thus that, at one breath, “independence and union” were declared and established. The confirmation of the first by war and of the second by civil wisdom was but the execution of the single design which it is the glory of this great instrument or our national existence to have framed and announced. The recognition of our independence, first by France and then by Great Britain, the closer union by the articles of confederation, and the final unity by the federal constitution were all but muniments of title of that “liberty and union, one and inseparable,” which were proclaimed at this place and on this day 100 years ago, which have been our possession from that moment hitherto, and which we surely avow shall be our possession forever.

Seven years of revolutionary war and twelve years of consummate civil prudence brought us, in turn, to the conclusive peace of 1783 and to the perfected constitution of 1787. Few chapters of the world’s history covering such brief periods are crowded with so many illustrious names or made up of events of so deep and permanent interest to mankind. I cannot stay to recall to your attention these characters, or these incidents, or to renew the gratitude and applause with which we never cease to contemplate them. It is only their relation to the Declaration of Independence itself that I need to insist upon and to the new state which it brought into existence. In this view these progressive processes were but the articulation of the members of the state and the adjustment of its circulation to the new center of its vital power. These processes were all implied and included in this political creation, and were as necessary and as certain, if it were not to languish and to die, as in any natural creature.

Within the hundred years, whose flight in our national history we mark to-day, we have had occasion to corroborate by war both the independence and the unity of the nation. In our war against England for neutrality, we asserted and we established the absolute right to be free of European entanglements, in time of war as well as in time of peace, and so completed our independence of Europe. And by the war of the constitution — a war within the nation — the bonds of our unity were tried and tested, as in a fiery furnace, and proved to be dependent upon no shifting vicissitudes

of acquiescence, no partial dissents or discontents, but, so far as is predicable of human fortunes, irrevocable, indestructible, perpetual.
Casibus hæc nullis, nullo debilis ævo.

OUR NEW POLITICAL SYSTEM.

We may be quite sure that the high resolve to stake the future of a great people upon a system of society and of polity that should dispense with the dogmas, the experience, the traditions, the habits, and the sentiments upon which the firm and durable fabric of the British constitution had been built up, was not taken without a solicitous and competent survey of the history, the condition, the temper, and the moral and intellectual traits of the people for whom the decisive step was taken.

It may, indeed, be suggested that the main body of the elements, and a large share of the arrangements of the new government, were expected to be upon the model of the British system, and that the substantials of civil and religious liberty and the institutions for their maintenance and defense were already the possession of the people of England, and the birthright of the colonists. But this consideration does not much disparage the responsibility assumed in discarding the correlative parts of the British constitution. I mean the established church and throne; the permanent power of a hereditary peerage; the confinement of popular representation to the wealthy and educated classes; and the ideas of all participation by the people in their own government coming by gracious concession from the royal prerogative, and not by inherent right in themselves. Indeed, the counter consideration, so far as the question was to be solved by experience, would be a ready one. The foundation, and the walls, and the roof of this firm and noble edifice, it would be said, are all fitly framed together in the substantial institutions you propose to omit from your plan and model. The convenience and safety and freedom, the pride and happiness which the inmates of this temple and fortress enjoy, as the rights and liberties of Englishmen, are only kept in place and play because of the firm structure of these ancient strongholds of religion and law, which you now desert and refuse to build anew.

Our fathers had formed their opinions upon wiser and deeper views of man and Providence than these, and they had the courage of their opinions.

Tracing the progress of mankind in the ascending path of civilization, enlightenment, and moral and intellectual culture, they found that the divine ordinance of government, in every stage of the ascent, was adjustable on principles of common reason to the actual condition of a people, and always had for its objects, in the benevolent counsels of the divine wisdom, the happiness, the expansion, the security, the elevation of society, and the redemption of man. They sought in vain for any title of authority of man over man, except of superior capacity and higher morality. They found the origin of castes and ranks, and principalities and powers, temporal or spiritual, in this conception. They recognized the people as the structure, the temple, the fortress, which the great Artificer all the while cared for and built up. As through the long march of time this work advanced, the forms and fashions of government seemed to them to be but the scaffolding and apparatus by which the development of a people's greatness was shaped and sustained. Satisfied that the people whose institutions were now to be projected had reached all that measure of strength and fitness of preparation for self-government which old institutions could give, they fearlessly seized the happy opportunity to clothe the people with the majestic attributes of their own sovereignty, and consecrate them to the administration of their own priesthood.

The repudiation by England of the spiritual power of Rome at the reformation was, by every estimate, a stupendous innovation in the rooted allegiance of the people, a profound disturbance of all adjustments of authority. But Henry VIII, when he displaced the dominion of the pope, proclaimed himself the head of the church. The overthrow of the ancient monarchy of France, by the fierce triumph of an enraged people, was a catastrophe that shook the arrangements of society from center to circumference. But Napoleon, when he pushed aside the royal line of St. Louis, announced: "I am the people crowned," and set up a plebeian emperor as the impersonation and depositary in him and his line forever of the people's sovereignty. The founders of our commonwealth conceived that the people of these colonies needed no interception of the supreme control of their own affairs, no conciliations of mere names and images of power, from which the pith and vigor of authority had departed. They, therefore, did not hesitate to throw down the partitions of power and right, and break up the distribu-

tive shares in authority of ranks and orders of men, which indeed had ruled and advanced the development of society in civil and religious liberty, but might well be neglected when the protected growth was assured, and all tutelary supervision, for this reason, henceforth could only be obstructive and incongruous.

ENGLISH AND FRENCH REPUBLICS.

A glance at the fate of the English essay at a commonwealth which preceded, and to the French experiment at a republic, which followed our own institution "of a new state of a new species," will show the marvelous wisdom of our ancestors, which struck the line between too little and too much; which walked by faith indeed for things invisible, but yet by sight for things visible; which dared to appropriate everything to the people which had belonged to Cæsar, but to assume for mortals nothing that belonged to God.

No doubt it was a deliberation of prodigious difficulty, a decision of infinite moment, which should settle the new institutions of England after the execution of the king, and determine whether they should be popular or monarchical. The problem was too vast for Cromwell and the great men who stood about him, and halting between the only possible opinions, they simply robbed the throne of stability, without giving to the people the choice of their rulers. Had Cromwell assumed the state and style of king, and assigned the constitutional limits of prerogative, the statesmen of England would have anticipated the establishment of 1688, and saved the disgraces of the intervening record. If, on the other hand, the ever-recurring consent of the people in vesting the chief magistracy had been accepted for the constitution of the state, the revolution would have been intelligible, and might have proved permanent. But what a "Lord Protector" was, nobody knew, and what he might grow to be, everybody wondered and feared. The aristocracy could endure no dignity above them less than a king's. The people knew the measure and the title of the chartered liberties which had been wrested or yielded from the king's prerogative; but what the division between them and a lord protector would be no one could forecast. A brief fluttering between the firmament above and the firm earth beneath, with no poise with either, and the discordant scheme was rolled away as a scroll. A hundred years afterward, Montesquieu derided "this impotent effort of the

English to establish a democracy," and divined the true cause of its failure. The supreme place, no longer sacred by the divinity that doth hedge about a king, irritated the ambitious to which it was inaccessible, except by faction and violence. "The government was incessantly changed, and the astonished people sought for democracy and found it nowhere. After much violence, and many shocks and blows, they were fain to fall back upon the same government they had overthrown."

The English experiment to make a commonwealth without sinking its foundations into the firm bed of popular sovereignty, necessarily failed. Its example and its lesson, unquestionably, were of the greatest service in sobering the spirit of English reform in government, to the solid establishment of constitutional monarchy, on the expulsion of the Stuarts, and in giving courage to the statesmen of the American revolution to push on to the solid establishment of republican government, with the consent of the people as its every-day working force.

But if the English experiment stumbled in its logic by not going far enough, the French philosophers came to greater disaster by overpassing the lines which mark the limits of human authority and human liberty, when they undertook to redress the disordered balance between people and rulers, and renovate the government of France. To the wrath of the people against kings and priests they gave free course, not only to the overthrow of the establishment of the church and state, but to the destruction of religion and society. They defied man, and thought to raise a tower of man's building, as of old on the plain of Shinar, which should overtop the battlements of heaven, and frame a constitution of human affairs that should displace the providence of God. A confusion of tongues put an end to this ambition. And now, out of all its evil, have come the salutary checks and discipline in freedom, which have brought passionate and fervid France to the scheme and frame of a sober and firm republic like our own, and, we may hope, as durable.

OUR DEBT TO THE MEN OF 1776.

How much, then, hung upon the decision of the great day we celebrate, and upon the wisdom and the will of the men who fixed the immediate, and if so, the present fortunes of this people. If the body, the spirit, the texture of our political life had not been

collectively declared on this day, who can be bold enough to say when and how independence, liberty, union, would have been combined, confirmed, assured to this people? Behold, now, the greatness of our debt to this ancestry, and the fountain, as from a rock smitten in the wilderness, from which the stream of this nation's growth and power takes its source. For it is not alone in the memory of their wisdom and virtues that the founders of a state transmit and perpetuate their influences in its lasting fortunes, and shape the character and purposes of its future rulers. "In the birth of societies," says Montesquieu, "it is the chiefs of a state that make its institutions; and afterward it is these institutions that form the chiefs of the state."

And what was this people, and what their traits and training that could justify this congress of their great men in promulgating the profound views of government and human nature which the Declaration embodies, and expecting their acceptance as "self-evident?" How had their lives been disciplined, and how their spirits prepared that the new launched ship, freighted with all their fortunes, could be trusted to their guidance with no other chart or compass than these abstract truths? What warrant was there for the confidence that upon these plain precepts of equality of right, community of interest, reciprocity of duty, a polity could be framed which might safely discard Egyptian mystery, and Hebrew reverence, and Grecian subtlety, and Roman strength—dispense, even, with English traditions of

"Primogenity and due of birth,
Prerogative of age, crowns, scepters, laurels."

To these questions the answer was ready and sufficient. The delegates to this immortal assembly, speaking for the whole country and for the respective colonies, their constituents might well say:

"What we are, such are this people. We are not here as volunteers, but as their representatives. We have been designated by no previous official station, taken from no one employment or condition of life, chosen from the people at large because they cannot assemble in person, and selected because they know our sentiments, and we theirs, on the momentous question which our deliberations are to decide. They know that the result of all hangs on the

intelligence, the courage, the constancy, the spirit of the people themselves. If these have risen to a height, and grown to a strength and unanimity that our judgment measures as adequate to the struggle for independence and the whole sum of their liberties, they will accept that issue and follow that lead. They have taken up arms to maintain their rights, and will not lay them down until those rights are assured. What the nature and sanctions of this security are to be, they understand must be determined by united counsels and concerted action. These they have deputed us to settle and proclaim, and this we have done to-day. What we have declared, the people will avow and confirm. Henceforth it is to this people a war for the defense of their united independence against its overthrow by foreign arms. Of that war there can be but one issue. And for the rest, as to the constitution of the new states, its species is disclosed by its existence. The condition of the people is equal; they have the habits of freemen and possess the institutions of liberty. When the political connection with the parent state is dissolved they will be self-governing and self-governed of necessity. As all governments in this world, good and bad, liberal or despotic, are of men, by men, and for men, this new state, having no estates or ranks, or degrees discriminating among men in its population, becomes at once a government of the people, by the people, and for the people. So it must remain, unless foreign conquest or domestic usurpation shall change it. Whether it shall be a just, wise, or prosperous government, it must be a popular government, and correspond with the wisdom, justice, and fortunes of the people."

ATTRACTIONS OF SELF-GOVERNMENT.

And so this people, of various roots and kindred of the Old World — settled and transfused in their cisatlantic homes into harmonious fellowship in the sentiments, the interests, the habits, the affections which develop and sustain a love of country — were committed to the common fortunes which should attend an absolute trust in the primary relations between man and his fellows, and between man and his Maker. This Northern Continent of America had been opened and prepared for the transplantation of the full-grown manhood of the highest civilization of the Old World to a place where it could be free from mixture or collision with com-

peting or hostile elements, and separated from the weakness and the burdens which it would leave behind. The impulses and attractions which moved the emigration and directed it hither, various in form, yet had so much a common character as to merit the description of being public, elevated, moral, or religious. They included the desire of new and better opportunities for institutions consonant with the dignity of human nature and with the immortal and infinite relations of the race. In the language of the times, the search for civil and religious liberty animated the Pilgrims, the Puritans, and the Churchmen, the Presbyterians, the Catholics, and the Quakers — the Huguenots, the Dutch, and the Walloons — the Waldeneses, the Germans, and the Swedes, in their several migrations which made up the colonial population. Their experience and fortunes here had done nothing to reduce, everything to confirm the views and traits which brought them hither. To sever all political relations, then, with Europe, seemed to these people but the realization of the purposes which had led them across the ocean — but the one thing needful to complete this continent for their home, and to give the absolute assurance of that higher life which they wished to lead. The preparation of the past and the enthusiasms of the future conspired to favor the project of self-government, and invest it with a moral grandeur which furnished the best omens and the best guarantees for its prosperity. Instead of a capricious and giddy exaltation of spirit, as at new gained liberty, a sober and solemn sense of the larger trust and duty took possession of their souls; as if the Great Master had found them faithful over a few things, and had now made them rulers over many.

These feelings, common to the whole population, were not of sudden origin, and were not romantic, nor had they any tendency to evaporate in noisy boast, or run wild in air-drawn projects. The difference between equality and privilege, between civil rights and capricious favors, between freedom of conscience and persecution for conscience sake, were not matters of most debate or abstract conviction with our countrymen. The story of these battles of our race was the warm and living memory of their forefathers' share in them, for which, "to avoid insufferable grievances at home, they had been enforced by heaps to leave their native countries." They proposed to settle forever the question whether such grievances should possibly befall them or their posterity. They knew no plan

so simple, so comprehensive, or so sure to this end as to solve all the minor difficulties in the government of society by a radical basis for its source, a common field for its operation, and an authentic and deliberate method for consulting and enforcing the will of the people as the sole authority of the state.

By this wisdom they at least would shift, within the sphere of government, the continuous warfare of human nature, on the field of good and evil, right and wrong,

“Between whose endless jar justice resides,”

from conflicts of the strength of the many against the craft of the few. They would gain the advantage of supplying as the reason of the state, the reason of the people, and decide by the moral and intellectual influences of instruction and persuasion, the issue of who should make and who administer the laws. This involved no pretensions of the perfection of human nature, nor did it assume that at other times, or under other circumstances, they would themselves have been capable of self-government; or, that other people then were, or ever would be, so capable. Their knowledge of mankind showed them that there would be faults and crimes so long as there were men. Their faith taught them that this corruptible would put on incorruption only when this mortal should put on immortality. Nevertheless they believed in man and trusted in God, and on these imperishable supports they thought they might rest civil government for a people who had these living conceptions wrought into their own characters and lives.

The past and the present are the only means by which man foresees or shapes the future. Upon the evidence of the past, the contemplation of the present of this people, our statesmen were willing to commence a system which must continually draw, for its sustenance and growth, upon the virtue and vigor of the people. From this virtue and this vigor it can alone be nourished; it must decline in their decline and rot in their decay. They traced this vigor and virtue to inexhaustible springs. And, as the unspent heat of a lava soil quickened by the returning summers, through the vintages of a thousand years, will still glow in the grape and sparkle in the wine, so will the exuberant forces of a race supply an unstinted vigor to mark the virtues of immense populations and to the remotest generations.

To the frivolous philosophy of human life which makes all the world a puppet show, and history a book of anecdotes, the moral warfare which fills up the life of man and the record of his race seems as unreal and as aimless as the conflicts of the glittering hosts upon an airy field, whose display lights up the fleeting splendors of a northern night. But free government for a great people never comes from or gets aid from such philosophers. To a true spiritual discernment there are few things more real, few things more substantial, few things more likely to endure in this world than human thoughts, human passions, human interests, thus molten into the frame and model of our state. "*O morem præclaram, disciplinamque, quam a majoribus accepimus, si quidem teneremus!*"

I have made no account, as unsuitable to the occasion, of the distribution of the national power between the general and the state governments, or of the special arrangements of executive authority, of legislatures, courts, and magistracies, whether of the general or of the state establishments. Collectively they form the body and the frame of a complete government for a great, opulent, and powerful people, occupying vast regions, and embracing in their possessions a wide range of diversity of climate, of soil, and of all the circumstantial influences of external nature. I have pointed your attention to the principle and the spirit of the government for which all this frame and body exists, to which they are subservient, and to whose mastery they must conform. The life of the natural body is the blood, and the circulation of the moral and intellectual forces and impulses of the body politic shapes and molds the national life. I have touched, therefore, upon the traits that determined this national life, as to be of, from, and for the people, and not of, from, or for any rank, grade, part, or section of them. In these traits are found the "ordinances, constitutions, and customs" by a wise choice of which the founders of states may, Lord Bacon says, "sow greatness to their posterity and succession."

And now, after a century of growth, of trial, of experience, of observation, and of demonstration, we are met, on the spot and on the date of the great declaration, to compare our age with that of our fathers, our structure with their foundation, our intervening history and present condition with their faith and prophecy. That "respect to the opinion of mankind," in attention to which our statesmen framed the Declaration of Independence, we, too, ac-

knowledge as a sentiment most fit to influence us in our commemorative gratulations to-day.

RESULTS OF THE CENTURY.

To this opinion of mankind, then, how shall we answer the questioning of this day? How have the vigor and success of the country's warfare comported with the sounding phrase of the great manifesto? Has the new nation been able to hold its territory on the eastern rim of the continent, or has covetous Europe driven in its boundaries, or internal dissensions dismembered its integrity? Have its numbers kept pace with natural increase, or have the mother countries received back to the shelter of firmer institutions the repentant tide of emigration? or have the woes of unstable society distressed and reduced the shrunk population? Has the free suffrage, as a quicksand, loosened the foundations of power and undermined the pillars of the state? Has the free press, with illimitable sweep, blown down the props and buttresses of order and authority in government, driven before its wind the barriers which fence in society, and unroofed the homes which once were castles against the intrusion of a king? Has freedom in religion ended in freedom from religion? and independence by law run into independence of law? Have free schools, by too much learning, made the people mad? Have manners declined, letters languished, art faded, wealth decayed, public spirit withered? Have other nations shunned the evil example, and held aloof from its infection? Or have reflection and hard fortune dispelled the illusions under which this people "burned incense to vanity, and stumbled in their ways from the ancient paths?" Have they, fleeing from the double destruction which attends folly and arrogance, restored the throne, rebuilt the altar, relaid the foundations of society, and again taken shelter in the old protections against the perils, shocks, and changes in human affairs, which

"Divert and crack, rend and deracinate
The unity and married calm of states
Quite from their fixture?"

Who can recount in an hour what has been done in a century, on so wide a field, and in all its multitudinous aspects? Yet I may not avoid insisting upon some decisive lineaments of the material, so-

cial, and political development of our country which the record of the hundred years displays, and thus present to "the opinion of mankind," for its generous judgment, our nation as it is to-day — our land, our people, and our laws. And, first, we notice the wide territory to which we have steadily pushed on our limits. Lines of climate mark our boundaries north and south, and two oceans east and west. The space between, speaking by and large, covers the whole temperate zone of the continent, and in area measures near tenfold the possessions of the thirteen colonies, the natural features, the climate, the productions, the influences of the outward world, are all implied in the immensity of this domain, for they embrace all that the goodness and the power of God have planned for so large a share of the habitable globe. The steps of the successive acquisitions, the impulses which assisted, and the motives which retarded the expansion of our territory; the play of the competing elements in our civilization and their incessant struggle each to outrun the other; the irrepressible conflict thus nursed in the bosom of the state; the lesson in humility and patience, "in charity for all and malice toward none," which the study of the manifest designs of Providence so plainly teach us — these may well detain us for a moment's illustration.

EMANCIPATION.

And this calls attention to that ingredient in the population of this country which came, not from the culminated pride of Europe, but from the abject despondency of Africa. A race discriminated from all the converging streams of immigration which I have named by ineffaceable distinctions of nature; which was brought hither by a forced migration and into slavery, while all others came by choice and for greater liberty; a race unrepresented in the Congress which issued the Declaration of Independence, but now, in the persons of 4,000,000 of our countrymen, raised by the power of the great truths then declared, as it were from the dead, and rejoicing in one country and the same constituted liberties with ourselves.

In August, 1620, a Dutch slave-ship landed her freight in Virginia, completing her voyage soon after that of the Mayflower commenced. Both ships were on the ocean at the same time, both sought our shores, and planted their seeds of liberty and slavery to grow together on this chosen field until the harvest. Until the separation from England the several colonies attracted each their own

emigration, and from the sparseness of the population, both in the Northern and Southern colonies and the policy of England in introducing African slavery, wherever it might, in all of them, the institution of slavery did not raise a definite and firm line of division between the tides of population which set in upon New England and Virginia from the Old World, and from them later, as from new points of departure, were diffused over the continent. The material interests of slavery had not become very strong, and in its moral aspects no sharp division of sentiment had yet shown itself. But when unity and independence of government were accepted by the colonies, we shall look in vain for any adequate barrier against the natural attraction of the softer climate and rich productions of the South, which could keep the Northern population in their harder climate and on their less grateful soil, except the repugnancy of the two systems of free and slave labor to commixture. Out of this grew the impatient, and apparently premature, invasion of the Western wilds, pushing constantly onward, in parallel lines, the outposts of the two rival interests. What greater enterprise did for the Northern people in stimulating this movement was more than supplied to the Southern by the pressing necessity for new lands, which the requirements of the system of slave cultivation imposed. Under the operation of these causes the political divisions of the country built up a wall of partition running east and west, with the novel consequences of the "Border States" of the country being ranged, not on our foreign boundaries, but on this middle line, drawn between the free and slave states. The successive acquisitions of territory, by the Louisiana purchase, by the annexation of Texas, and by the treaty with Mexico, were all in the interest of the southern policy, and, as such, all suspected or resisted by the rival interest in the north. On the other hand, all schemes or tendencies toward the enlargement of our territory on the north were discouraged and defeated by the south. At length, with the immense influx of foreign immigration, reënforcing the flow of population, the streams of free labor shot across the continent. The end was reached. The bounds of our habitation were secured. The Pacific possessions became ours, and the discovered gold rapidly peopled them from the hives of free labor. The rival energies and ambitions which had fed the thirst for territory had served their purpose, in completing and assuring the domain of the nation.

The partition wall of slavery was thrown down; the line of Border States obliterated; those who had battled for territory, as an extension and perpetuation of slavery, and those who fought against its enlargement, as a disparagement and a danger to liberty, were alike confounded.

Those who feared undue and precipitate expansion of our possessions, as loosening the ties of union, and those who desired it, as a step toward dissolution, have suffered a common discomfiture. The immense social and political forces which the existence of slavery in this country, and the invincible repugnance to it of the vital principles of our state, together generated, have had their play upon the passions and the interests of this people, have formed the basis of parties, divided sects, agitated and invigorated the popular mind, inspired the eloquence, inflamed the zeal, informed the understandings, and fired the hearts of three generations. At last the dread debate escaped all bounds of reason, and the nation in arms solved, by the appeal of war, what was too hard for civil wisdom. With our territory un mutilated, our constitution uncorrupted, a united people, in the last years of the century, crowns with new glory the immortal truths of the Declaration of Independence by the emancipation of a race.

PROMISE OF NATIONAL LONGEVITY.

I find, then, in the method and the results of the century's progress of the nation in this amplification of its domain, sure promise of the duration of the body politic, whose growth to these vast proportions has, as yet, but laid out the ground plan of the structure. For I find the vital forces of the free society and the people's government, here founded, have by their own vigor made this a natural growth. Strength and symmetry have knit together the great frame as its bulk increased, and the spirit of the nation animates the whole:

——“totamque infusa per artus,
Mens agitat molem, et magnose, corpore miscet.”

We turn now from the survey of this vast territory, which the closing century has consolidated and confirmed as the ample home for a nation, to exhibit the greatness in numbers, the spirit, the character, the port and mien of the people that dwell in this secure habitation. That in these years, our population has steadily ad-

vanced, till it counts 40,000,000 instead of 3,000,000, bears witness, not to be disparaged or gainsayed, to the general congruity of our social and civil institutions with the happiness and prosperity of man. But if we consider further the variety and magnitude of foreign elements to which we have been hospitable, and their ready fusion with the earlier stocks, we have new evidence of strength and vivid force in our population, which we may not refuse to admire. The disposition and the capacity thus shown give warrant of a powerful society. "All nations," says Lord Bacon, "that are liberal of naturalization are fit for empire."

Wealth in its mass, and still more in its tenure and diffusion, is a measure of the condition of a people which touches both its energy and morality. Wealth has no source but labor. "Life has given nothing valuable to man without great labor." This is as true now as when Horace wrote it. The prodigious growth of wealth in this country is not only, therefore, a signal mark of prosperity, but proves industry, persistency, thrift, as the habits of the people. Accumulation of wealth, too, requires and imports security, as well as unfettered activity; and thus it is a fair criterion of sobriety and justice in a people, certainly, when the laws and their execution rest wholly in their hands. A careless observation of the crimes and frauds which attack prosperity, in the actual condition of our society, and the imperfection of our means for their prevention and redress, leads sometimes to an unfavorable comparison between the present and the past, in this country, as respects the probity of the people. No doubt covetousness has not ceased in the world, and thieves still break through and steal. But the better test upon this point is the vast profusion of our wealth and the infinite trust shown by the manner in which it is invested. It is not too much to say that in our times, and conspicuously in our country, a large share of every man's property is in other men's keeping and management, unwatched and beyond personal control. This confidence of man in man is ever increasing, measured by our practical conduct, and refutes these disparagements of the general morality.

Knowledge, intellectual activity, the mastery of nature, the discipline of life—all that makes up the education of a people—are developed and diffused through the masses of our population, in so ample and generous a distribution as to make this the conspicuous

trait in our national character, as the faithful provision and extension of the means and opportunities of this education are the cherished institutions of the country. Learning, literature, science, art, are cultivated, in their widest range and highest reach, by a larger and larger number of our people, not, to their praise be it said, as personal distinction or a selfish possession, but mainly as a generous leaven, to quicken and expand the healthful fermentation of the general mind, and lift the level of popular instruction. So far from breeding a distempered spirit in the people, this becomes the main prop of authority, the great instinct of obedience. "It is by education," says Aristotle, "I have learned to do by choice what other men do by constraint of fear."

SPIRIT OF OUR PEOPLE.

The "breed and disposition" of a people, in regard of courage, public spirit and patriotism are, however, the test of the working of their institutions, which the world most values, and upon which the public safety most depends. It has been made a reproach of democratic arrangements of society and government, that the sentiment of honor, and of pride in public duty, decayed in them. It has been professed that the fluctuating currents and the trivial perturbations of their public life discouraged strenuous endeavor and lasting devotion in the public service. It has been charged that, as a consequence, the distinct service of the state suffered, office and magistracy were belittled, social sympathies cooled, love of country drooped, and selfish affections absorbed the powers of the citizens, and eat into the heart of the commonwealth.

The experience of our country rejects these speculations as misplaced, and these fears as illusory. They belong to a condition of society above which we have long since been lifted, and toward which the very scheme of our national life prohibits a decline. They are drawn from the examples of history, which lodged power formally in the people, but left them ignorant and abject, unfurnished with the means of exercising it in their own right and for their own benefit. In a democracy wielded by the arts, and to the ends of a patrician class, the less worthy members of that class, no doubt, thrived by the disdain which noble characters must always feel for methods of deception and insincerity, and crowded them from the authentic service of the state. But, through the period

whose years we count to-day, the greatest lesson of all is the preponderance of public over private, of social over selfish tendencies and purposes in the whole body of the people, and the persistent fidelity to the genius and spirit of popular institutions, of the educated classes, the liberal professions, and the great men of the country. These qualities transfuse and blend the hues and virtues of the manifold rays of advanced civilization into a sunlight of public spirit and fervid patriotism, which warms and irradiates the life of the nation. Excess of publicity as the animating spirit and stimulus of society more probably than its lack will excite our solitudes in the future. Even the public discontents take on this color, and the mind and heart of the whole people ache with anxieties and throb with griefs which have no meaner scope than the honor and safety of the nation.

Our estimate of the condition of this people at the close of a century—as bearing on the value and efficiency of the principles on which the government was founded, in maintaining and securing the permanent well-being of a nation—would, indeed, be incomplete if we failed to measure the power and purity of the religious elements which pervade and elevate our society. One might as well expect our land to keep its climate, its fertility, its salubrity, and its beauty, were the globe loosened from the law which holds it in an orbit, where we feel the tempered radiance of the sun, as to count upon the preservation of the delights and glories of liberty for a people cast loose from religion, whereby man is bound in harmony with the moral government of the world.

It is quite certain that the present day shows no such solemn absorption in the exalted themes of contemplative piety, as marked the prevalent thought of the people a hundred years ago; nor so hopeful an enthusiasm for the speedy renovation of the world, as burst upon us in the marvelous and wide system of vehement, religious zeal and practical good works in the early part of the nineteenth century. But these fires are less splendid only because they are more potent, and diffuse their heat in well formed habits and manifold agencies of beneficent activity. They traverse and permeate society in every direction. They travel with the outposts of civilization, and outrun the caucus, the convention, and the suffrage.

The church, throughout this land, upheld by no political establish-

ment, rests all the firmer on the rock on which its founder built it. The great mass of our countrymen to-day find in the Bible — the Bible in their worship, the Bible in their schools, the Bible in their households — the sufficient lessons of the fear of God and the love of man, which make them obedient servants to the free constitution of their country, in all civil duties, and ready with their lives to sustain it on the fields of war. And now at the end of a hundred years, the Christian faith collects its worshipers throughout our land, as at the beginning. What half a century ago was hopefully prophesied for our far future, goes on to its fulfillment: “As the sun rises on a Sabbath morning, and travels westward from Newfoundland to the Oregon, he will behold the countless millions assembling, as if by a common impulse, in the temples with which every valley, mountain and plain will be adorned. The morning psalm and the evening anthem will commence with the multitudes on the Atlantic coast, be sustained by the loud chorus of ten thousand times ten thousand, in the valley of the Mississippi, and be prolonged by the thousands of thousands on the shores of the Pacific.”

STRENGTH OF OUR SYSTEM.

What remains but to search the spirit of the laws of the land, as framed by and modeled to the popular government to which our fortunes were committed by the Declaration of Independence? I do not mean to examine the particular legislation, state or general, by which the affairs of the people have been managed, sometimes wisely and well, at others feebly and ill, nor even the fundamental arrangement of political authority, or the critical treatment of great junctures in our policy and history. The hour and the occasion concur to preclude so intimate an inquiry. The chief concern in this regard, to us and to the rest of the world, is, whether the proud trust, the profound radicalism, the wide benevolence, which spoke in the “declaration,” and were infused into the “constitution” at the first, have been in good faith adhered to by the people, and whether now these principles supply the living forces which sustain and direct government and society.

He who doubts, needs but to look around to find all things full of the original spirit, and testifying to its wisdom and strength. We have taken no steps backward, nor have we needed to seek other paths in our progress than those in which our feet were planted at

the beginning. Weighty and manifold have been our obligations to the great nations of the earth, to their scholars, their philosophers, their men of genius and of science, to their skill, their taste, their invention, to their wealth, their arts, their industry. But in the institutions and methods of government—in civil prudence, courage or policy—in statesmanship, in the art of “making of a small town a great city”—in the adjustment of authority to liberty—in the concurrence of reason and strength in peace, of force and obedience in war—we have found nothing to recall us from the course of our fathers, nothing to add to our safety or to aid our progress in it. So far from this, all modifications of European politics accept the popular principles of our system, and tend to our model. The movements toward equality of representation, enlargement of the suffrage, and public education in England—the restoration of unity in Italy—the confederation of Germany under the lead of Prussia—the actual republic in France—the unsteady throne of Spain—the new liberties of Hungary—the constant gain to the people’s share in government throughout Europe—all tend one way—the way pointed out in the Declaration of our Independence.

The care and zeal with which our people cherish and invigorate the primary supports and defenses of their own sovereignty, have all the unswerving force and confidence of instincts. The community and publicity of education, at the charge and as an institution of the state, is firmly imbedded in the wants and desires of the people. Common schools are rapidly extending through the only part of the country which had been shut against them, and follow close upon the footsteps of its new liberty, to enlighten the enfranchised race. Freedom of conscience easily stamps out the first sparkles of persecution, and snaps as green withes the first bonds of spiritual domination. The sacred oracles of their religion, the people wisely hold in their own keeping as the keys of religious liberty, and refuse to be beguiled by the voice of the wisest charmer into loosing their grasp.

Freedom from military power, and the maintenance of that arm of the government in the people; a trust in their own adequacy as soldiers, when their duty as citizens should need to take on that form of service to the state; these have gained new force by the experience of foreign and civil war, and a standing army is a re-

most possible for this nation, in its present or prospective greatness, than in the days of its small beginnings.

But in the freedom of the press, and the universality of the suffrage, as maintained and exercised to-day throughout the length and breadth of the land, we find the most conspicuous and decisive evidence of the unspent force of the institutions of liberty and the jealous guard of its principal defenses. These indeed are the great agencies and engines of the people's sovereignty. They hold the same relations to the vast democracy of modern society that the persuasions of the orators and the personal voices of the assembly did in the narrow confines of the Grecian states. The laws, the customs, the impulses, and sentiments of the people have given wider and wider range and license to the agitations of the press, multiplied and more frequent occasions for the exercise of the suffrage, larger and larger communication of its franchise. The progress of a hundred years finds these prodigious activities in the fullest play—incessant and all-powerful—indispensable in the habits of the people, and impregnable in their affections. Their public service, and their subordination to the public safety, stand in their play upon one another and in their freedom thus maintained. Neither could long exist in true vigor in our system without the other. Without the watchful, omnipresent and indomitable energy of the press, the suffrage would languish, would be subjugated by the corporate power of the legions of placemen which the administration of the affairs of a great nation imposes upon it, and fall a prey to that "vast patronage which," we are told, "distracted, corrupted, and finally subverted the Roman republic." On the other hand, if the impressions of the press upon the opinions and passions of the people found no settled and ready mode of their working out, through the frequent and peaceful suffrage, the people would be driven, to satisfy their displeasure at government or their love of change, to the coarse methods of barricades and batteries.

OUR COUNTRY TO-DAY.

We cannot then hesitate to declare that the original principles of equal society and popular government still inspire the laws, live in the habits of the people, and animate their purposes and their hopes. These principles have not lost their spring or elasticity. They have sufficed for all the methods of government in the past;

we feel no fear for their adequacy in the future. Released now from the tasks and burdens of the formative period, these principles and methods can be directed with undivided force to the every-day conduct of government, to the staple and steady virtues of administration. The feebleness of crowding the statute-books with unexecuted laws; the danger of power outgrowing or evading responsibility; the rashness and fickleness of temporary expedients; the constant tendency by which parties decline into factions and end in conspiracies; all these mischiefs beset all governments and are part of the life of each generation. To deal with these evils — the tasks and burdens of the immediate future — the nation needs no other resources than the principles and the examples of our past history supply. These principles, these examples of our fathers, are the strength and the safety of our state to-day: "*Moribus antiquis, stat res Romana, virisque.*"

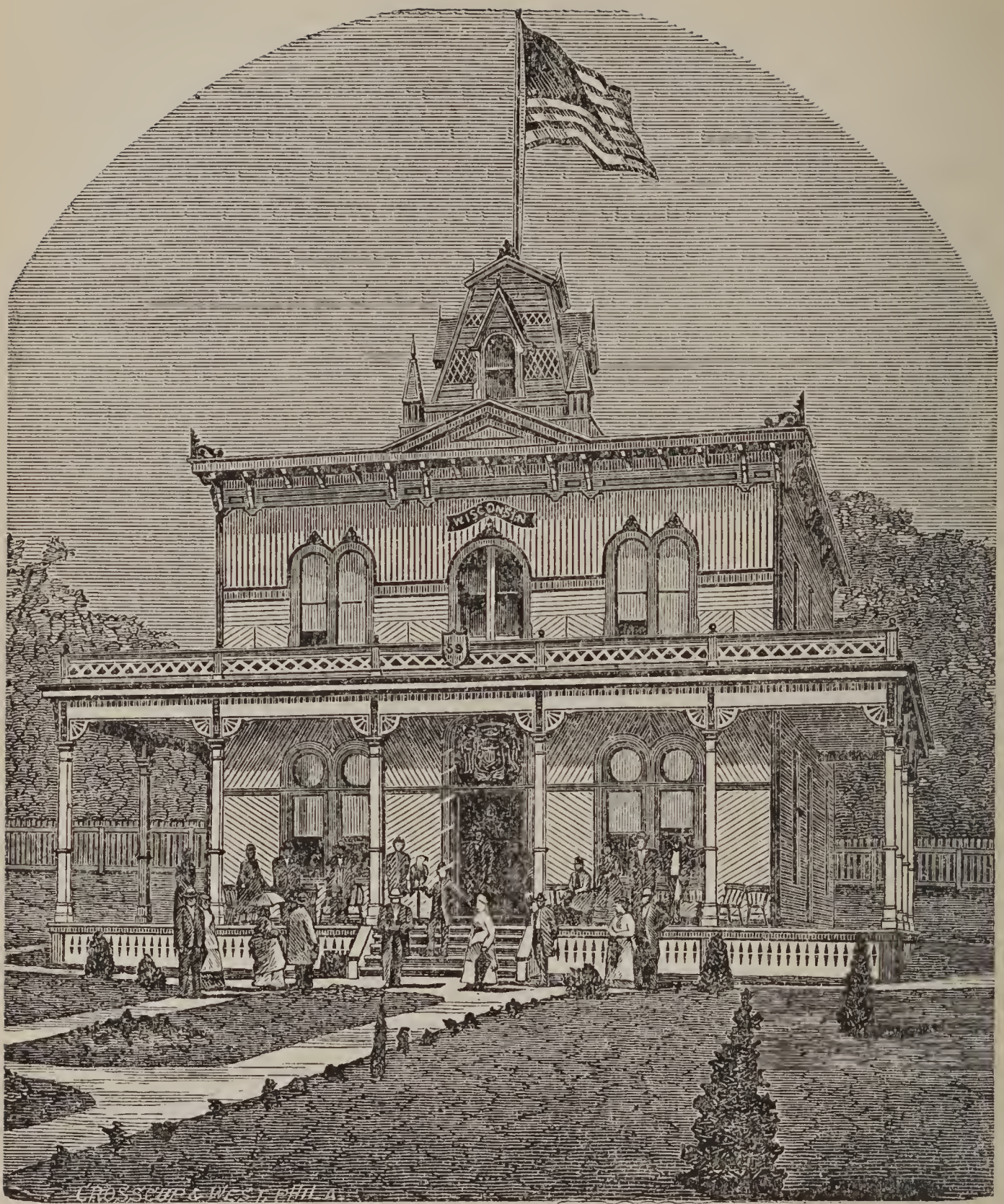
Unity, liberty, power, prosperity — these are our possessions to-day. Our territory is safe against foreign dangers; its completeness dissuades from further ambitions to extend it, and its rounded symmetry discourages all attempts to dismember it. No division into greatly unequal parts would be tolerable to either. No imaginable union of interests or passions, large enough to include one-half the country, but must embrace much more. The madness of partition into numerous and feeble fragments could proceed only from the hopeless degradation of the people, and would form but an incident in general ruin.

The spirit of the nation is at the highest — its triumph over the inborn, inbred perils of the constitution has chased away all fears, justified all hopes, and with universal joy we greet this day. We have not proved unworthy of a great ancestry; we have had the virtue to uphold what they so wisely, so firmly established. With these proud possessions of the past, with powers matured, with principles settled, with habits formed, the nation passes as it were from preparatory growth to responsible development of character, and the steady performance of duty. What labors await it, what trials shall attend it, what triumphs for human nature, what glory for itself, are prepared for this people in the coming century, we may not assume to foretell. "One generation passeth away, and another generation cometh, but the earth abideth forever," and we reverently hope that these our constituted liberties shall be main-

tained to the unending line of our posterity, and so long as the earth itself shall endure.

In the great procession of nations, in the great march of humanity, we hold our place. Peace is our duty, peace is our policy. In its arts, its labors, and its victories, then, we find scope for all our energies, rewards for all our ambitions, renown enough for all our love and fame. In the august presence of so many nations, which, by their representatives, have done us the honor to be witnesses of our commemorative joy and gratulation, and in sight of the collected evidences of the greatness of their own civilization with which they grace our celebration, we may well confess how much we fall short, how much we have to make up, in the emulative competitions of the times. Yet, even in this presence, and with a just deference to the age, the power, the greatness of the other nations of the earth, we do not fear to appeal to the opinion of mankind whether, as we point to our land, our people, and our laws, the contemplation should not inspire us with a lover's enthusiasm for our country.

Time makes no pauses in his march. Even while I speak the last hour of the receding is replaced by the first hour of the coming century, and reverence for the past gives way to the joys and hopes, the activities and the responsibilities of the future. A hundred years hence the piety of that generation will recall the ancestral glory which we celebrate to-day, and crown it with the plaudits of a vast population which no man can number. By the mere circumstance of this periodicity, our generation will be in the minds, in the hearts, on the lips of our countrymen at the next Centennial commemoration in comparison with their own character and condition and with the great founders of the nation. What shall they say of us? How shall they estimate the part we bear in the unbroken line of the nation's progress? And so on, in the long reach of time, forever and forever, our place in the secular roll of the ages must always bring us into observation and criticism. Under this double trust, then, from the past and for the future, let us take heed to our ways, and while it is called to-day, resolve that the great heritage we have received shall be handed down through the long line of the advancing generations, the home of liberty, the abode of justice, the stronghold of faith among men, "which holds the moral elements of the world together," and of faith in God, which binds that world to His throne.



WISCONSIN HEADQUARTERS, PHILADELPHIA.

STATE BOARD OF CENTENNIAL MANAGERS.

DAVID ATWOOD, *U. S. Com'r*,
 E. D. HOLTON, *Alt. U. S. Com'r*,
 J. B. PARKINSON, *Pres't, Madison*,
 FERD. KUEHN, *State Treas'r, Madison*,

ELI STILSON, *Oshkosh*,
 ADOLPH MEINECKE, *Milwaukee*,
 J. I. CASE, *Racine*,
 THAD. C. POUND, *Chippewa Falls*

W. W. FIELD, *Sec'y, Madison*.

ELISHA STARR, *Sup't, Milwaukee*.

THE CENTENNIAL EXHIBITION OF 1876.

BY HON. DAVID ATWOOD,
United States Centennial Commissioner.

CENTENNIAL ANNIVERSARY.

The year 1876 has been a memorable one in the history of the United States. It completed the first one hundred years of American independence, and it was fitting that this Centennial Anniversary should be celebrated in a manner that should properly commemorate the grand event which proclaimed to the world that the "United Colonies are, and of right ought to be, free and independent states," to effect which noble purpose our ancestors pledged their lives, their fortunes, and their sacred honors; an event that brought into existence a new nation.

FIRST MOVEMENT.

The first formal movement for such a celebration was made in Philadelphia in 1869. The subject was not seriously considered by Congress until the session of 1870-71. On the third of March, 1871, a bill was passed "to provide for celebrating the one hundredth anniversary of American Independence by holding an international exhibition of arts, manufactures, and products of the soil and mine, in the city of Philadelphia, in the year 1876." The preamble to this law set forth that, in view of that decisive event, "it is deemed fitting that the completion of the first century of our national existence shall be commemorated by an exhibition of the national resources of the country and their development, and of its progress in those arts which benefit mankind, in comparison with those of older nations."

CENTENNIAL COMMISSION CREATED.

With this object in view, the law enacted, created a commission, consisting of one commissioner and one alternate commissioner from each state and territory, charged with the duty of making preparation for the grand celebration; but it did not provide any means with which to defray expenses, nor any power

to raise means. The commissioners were appointed on the recommendation of governors of states and territories, by commission from the President of the United States. The first meeting of the Centennial Commission was held in Philadelphia on the 4th of March, 1871. Finding itself without means, this subject first attracted its special attention after its organization. It was finally resolved to ask congress to create a Centennial Board of Finance, with authority to raise by stock subscription an amount not exceeding ten millions of dollars, in shares of ten dollars each; and the proceeds thus raised to be used for the erection of suitable buildings, fixtures and appurtenances for carrying the exhibition to its close. Congress acceded to this request, and on the first of June, 1872, a law creating the board of finance was passed. Thus was presented the novel spectacle of two boards — the one to direct for what purpose the money should be expended, and the other to furnish the money with which to pay the bills. For no purpose less grand than the celebration contemplated could two boards thus constituted have acted in harmony. But actuated by motives of pure patriotism, the members of each board discharged their duties faithfully, and business progressed in harmony, to the successful termination of the grandest exhibition of the resources of the world that has ever been held in any country.

FOREIGN GOVERNMENTS INVITED.

It is not our purpose here to follow out the history of the labors connected with the preparation of this exhibition. This would require volumes. A few general points only can be touched upon. By the act it was provided that whenever the governor of Pennsylvania should inform the president of the United States that provision had been made for the erection of exhibition buildings, the president should declare, by proclamation, that the exhibition would be held in 1876, and that foreign nations should be invited to participate in it. On the 5th of July, 1873, such proclamation and invitation was issued, and the following governments responded favorably, and participated in the exhibition:

• GOVERNMENTS PARTICIPATING.

Argentine Republic, Austria-Hungary, Belgium, Brazil, Canada, Chili, China, Denmark, Egypt, France with Algeria, Germany,

Great Britain with colonies, viz.: Queensland, New Zealand, New South Wales, Victoria, South Australia, India, Cape of Good Hope, Bahamas, British Guiana, Ceylon, Straits Settlements, Gold Coast, Mauritius, Seychelles, Archipelago, Tasmania, Trinidad, India, Bermuda and Jamaica; Hawaii, Italy, Japan, Siberia, Luxemburg, Mexico, Netherlands, Norway, Orange Free States, Peru, Phillippine Islands, Portugal, Russia, Spain, Sweden, Switzerland, Tunis, Turkey and Venezuela.

LOCATION.

On the 4th of July, 1873, the commissioners of Fairmount Park formally conveyed 236 acres of land, in the most beautiful part of the enclosure, for the use of the centennial commission. On the 4th of July, 1874, ground was first broken for the construction of the exhibition buildings. At the opening of the exhibition, 194 buildings had been erected on the ground. The time for the exhibition to be held was fixed to begin on the 10th of May, 1876, and close on the 10th of November of the same year. The matter of raising money was a very difficult one. The general prostration of business of the country had rendered money scarce, and the people could not be induced to invest in the stock as extensively as had been hoped; still the work was pressed on with energy. The management never lost hope.

APPEALS TO CONGRESS FOR AID.

At the commencement of the session of congress, in December, 1875, a statement was made to that body by the board of finance, showing that \$5,187,750 had been raised for the purposes of the exhibition, and that \$1,537,100 was still necessary to carry the work through to the opening day, and leave the buildings free from debt, and a strong appeal was made to congress for aid. This appeal was responded to, with an appropriation of \$1,500,000, on the 14th of February, 1876. This was the first and only assistance in the way of ready means, received from the United States government in aid of this magnificent enterprise; and this was appropriated with the understanding that it was to be paid back before any profits should be divided — thus making the government, under whose auspices the exhibition was held, a preferred creditor.

On the 22d of April, 1876, the Board of Finance reported as having received from all sources the following amounts:

From the state of Pennsylvania.....	\$1,000,000
city of Philadelphia.....	1,500,000
stock subscriptions.....	2,500,000
appropriation by United States....	1,500,000
concessions, etc	500,000
Total	<u>\$7,000,000</u>

Of the stock subscriptions, \$1,872,180 were subscribed by citizens of the state of Pennsylvania. It was then estimated that the receipt of \$1,500,000 in admission fees would still be required to defray current expenses to the close of the exhibition. The actual receipts from admission fees reached nearly \$4,000,000; and the number of admissions was about ten millions of persons.

EXTENT OF BUILDINGS, ETC.

The exhibition buildings in the park covered an area of about seventy-five acres; and fifty-five nations and colonies were represented at the exhibition. The total number of exhibitors, American and foreign, was about forty thousand; and the number and variety of articles properly exhibited exceeded two hundred thousand. The value of the articles on exhibition was variously estimated at from fifty to one hundred millions of dollars. The labor of the Judges of Awards was very great; and over thirteen thousand articles received awards.

MAGNITUDE OF THE EXHIBITION.

Some idea of the magnitude of this exhibition may be gathered from an examination of the following table, which presents the weight of goods deposited in all of the principal buildings of the exhibition, the several "annexes" not being separately reported:

	<i>Pounds.</i>
In Art Gallery.....	2,100,900
Main Building.....	20,168,801
Machinery Hall.....	19,542,989
Agricultural Hall.....	6,534,766
Horticultural Hall	418,031
Shoe and Leather Building.....	574,387
Carriage Building.....	1,574,103
Women's Pavillion.....	98,698
Government Building.....	2,658,705
All other material.....	3,445,278
Total weight.....	<u>57,116,658</u>

AVERAGE DAILY ATTENDANCE.

The following table shows the daily average attendance at the exhibition by months:

May (from the 10th).....	19,946
June	26,756
July	24,481
August	33,655
September	81,961
October	89,789
November (till 10th)	102,100

GENERAL GOOD ORDER.

The order that prevailed on the ground, during the entire exhibition, was a very remarkable feature. The police regulations were admirable. A distinguished writer, in giving a general description of the whole affair, says: "The popular attendance was, after all, the great triumph of the American exhibition; the crowds were the most notable thing exhibited. It is not presumptuous to say, that no nation in the world could have gathered in its capital, such throngs of decent, orderly and intelligent people as visited Fairmount Park during September and October. Of riot and tumult there was never a symptom; of ruffianism or lewdness, the display was incredibly small; of drunkenness, despite the freedom in the exposure of ales and wines to which the majority of visitors were wholly unaccustomed, the instances were fewer, in the whole course of the exhibition, than often occur at a county fair in a single day."

IMMENSE PASSENGER TRANSPORTATION.

The passenger transportation was a wonderful feature. On the "Pennsylvania Day," there were run into and out of Philadelphia, on the two great lines of railroad, 638 passenger trains, in which were 2,993 cars, with 130,245 passengers.

We have thus glanced at a few of the prominent points connected with the preparation for, and the running of, this great International Exhibition. Of the exhibition itself we cannot speak. It has spoken itself, in language stronger than can be written; no pen can describe its magnitude and grandeur. It more than met the most sanguine expectations of its projectors, and of those interested in its management. It was a proud presentation of the products of our own country, in comparison with those of other nations, and

indicated a progress in the first hundred years of our national existence, that our own people could hardly realize, and that astonished our visitors from foreign countries. In fine, it was a magnificent success, in which every American heart should rejoice.

STATE BOARD ORGANIZED.

Having briefly noticed some of the prominent national features of this exhibition, a few words as to the part taken in it by our own state of Wisconsin may not be out of place. It was somewhat difficult to arouse an interest in this state; nor, until a short time previous to the opening, was there much action taken by our people, in preparing for a representation at Philadelphia. In the winter of 1875, the legislature made provision for the appointment of a State Board of Centennial Managers to look after the interests of the state in connection with this enterprise, and made an appropriation of \$2,000 to defray expenses. The State Board, as first appointed by the governor in April, 1875, consisted of the following members, to wit:

John B. Parkinson, Madison.
Eli Stilson, Oshkosh.
Jerome I. Case, Racine.
E. A. Calkins, Milwaukee.
Thad. C. Pound, Chippewa Falls.

David Atwood, U. S. Centennial Commissioner, and E. D. Holton, U. S. Alternate Commissioner, were, by this law, made *ex-officio* members of the State Board of Centennial Managers.

In April, 1875, the State Board was organized by the election of J. B. Parkinson, president, and W. W. Field, secretary. Several circulars, addresses, etc., were issued to the people, inviting them to aid in making such a representation of the various resources of our state as would give it a respectable position at the exhibition. A few responses were received during the season, not enough, however, to afford the managers special encouragement. They were not disheartened, but persevered in their efforts. After a few weeks Col. E. A. Calkins resigned his position as a member of the board, and Adolph Meinecke, of Milwaukee, was appointed to fill the vacancy thus created.

LEGISLATIVE APPROPRIATION.

During the session of the legislature of 1876, an appropriation of \$20,000 was made, to aid in preparing for the exhibition a fair representation of the natural resources and products of the state. By this law, Hon. Ferd. Kuehn, state treasurer, was added to the board, and made its treasurer. This act was passed on the 3d day of March, 1876. The managers, feeling encouraged by the liberality of the legislature, began at once the work of preparation with much energy. The time for work was short, and it was improved to the best possible advantage; and the results are known to the thousands of people from Wisconsin who visited Philadelphia during the months of the exhibition; and it is hardly necessary to say they were generally satisfactory to the people of the state.

STATE CENTENNIAL BUILDING.

First among the various things the managers deemed of importance was, the erection of a house on the centennial grounds, to be known as the Wisconsin headquarters. An eligible location was secured, and the work of building at once commenced. It was for the convenience of the people of this state that this house was projected, and the managers did not feel authorized to spend more money upon it than was necessary to make it respectable, in comparison with buildings from other states. A writer, unknown to the managers, makes mention of the Wisconsin house as follows:

“The state of Wisconsin does not challenge admiration by the beauty of the arrangements which she has made for the accommodation of her commissioners and citizens. There is no superfluity of ornament here, but the interior shows that the more important objects of *comfort* and *convenience* have been studied.” The same writer then describes the building thus: “The dimensions are 45 by 50 feet, height two stories, with a central, round-headed window, and window-door in front at the second story, and a double round-headed window on each side. A small cupola of pyramidal shape rises above the ornamental pediment, and is surmounted by a flag-staff. A piazza, supported by plain pillars, extends around the eastern, western and southern sides of the house. From the main entrance door a hall extends through the building, seven feet wide. On the western side is the ladies’ parlor, 16 by 20 feet, which is

connected with a retiring room in the rear. The floor is covered with Brussels; the walls covered with gilt paper, the ceiling with light blue, and panelings with thick Wisconsin paper, in imitation of woods, being arranged at the proper places. On the east side there is a reception room, 20 by 16 feet, for gentlemen, baggage-room, wash-room, and a reading-room, which is furnished with files of papers published in Wisconsin. A stairway leads to the second floor, upon which the main hall, running from north to south, is of the same width of the one below. This story is divided into six rooms, three upon each side of the hall, which are used as sleeping apartments by employes, in addition to which there is a business office." Here, says the writer, "presides the war eagle, 'Old Abe,' a bird which can boast of a biography, the particulars of which some of the Badger State attendants will be glad to relate." Thus does a stranger describe the Wisconsin headquarters on the centennial grounds; and from this description, and an examination of an excellent picture of the building, in this volume, a person can form a reasonably correct idea of the Wisconsin Home, at the Centennial Exhibition.

SUPERINTENDENT OF HOME.

The State Centennial Managers were certain that the people of the state would feel much better pleased with a building bearing the foregoing plain description, than they would be with one possessing more costly ornamentation, and with less comforts. It was the comfort of the people that the board endeavored to provide for; and in this, from the many expressions of commendation they have received from visitors, they feel assured they were reasonably successful. Col. Elisha Starr, of Milwaukee, an old settler, well known to the people of the state, was selected as superintendent of the Wisconsin Home; a choice that was universally commended by all who visited the centennial grounds from this state. Mr. Starr was constant in his attendance; gentlemanly in his conduct to all persons; and, in all things, devoted to the comfort of visitors, and to the interests of the state.

STATE AGRICULTURAL EXHIBIT.

Of the several state exhibits, a few words may be properly written in this place. In the Agricultural Hall, there was a fair display of the agricultural products of Wisconsin. A stand was

erected on the space allotted to our state, in pyramidal form, upon which were placed in glass jars the different grains and seeds grown in this state, to the number of from 300 to 400. These products were selected from most of the counties in the state, thus rendering them a fair representation of every part of it, and they made a creditable exhibition. Upon the same platform, and surrounding the central pyramid, were displayed the various woods of the state, in sections, planks, blocks, etc., most of which were presented by the managers of the Wisconsin Central Railway Company. It was an attractive showing of the woods of our forests, and was productive of much good, as many people in other portions of the country have an impression that Wisconsin is rather destitute of wood land, a matter in which they are grandly mistaken, as was proved by this exhibition of our superior timber. There were also exhibited here fine specimens of corn in the ear, hops, tobacco, wool, and various other Wisconsin products. There was also a splendid map of the state, prepared with great care, upon which was designated the different kinds of land — as prairie, openings, timber and marsh lands; the population by counties; their nativity; the number of acres under cultivation in each, etc., etc., affording a vast amount of valuable information. The agricultural interests of the state were very well represented, and received much attention from the millions of visitors. Some person was in attendance at this stand, to explain to visitors the various articles on exhibition, and to impart general information to strangers in regard to our state. Messrs. William Hover, L. E. Walker, and A. D. Smith, discharged this duty in a satisfactory manner, at different times.

MINERAL—HISTORICAL SOCIETY, etc.

In the main building annex was the mineral exhibit of the state. It was large and attractive. The entire cabinet of the productions from the Wisconsin mines, belonging to the late Hon. Increase A. Lapham, formed an important part of it; and much was added from other collections — from the geological commission and from individuals — so that the mineral resources of the state were very fully represented. Specimens of the various stones, sands, paints, etc., were exhibited in the same space; and there was also a good show of the celebrated Milwaukee brick. In cases prepared expressly for them, were exhibited the prehistoric stone and copper imple-

ments belonging to the State Historical Society. This proved to be a very interesting exhibit, and by far the largest collection of articles of this kind that was found at the exhibition; and it is claimed to be the largest in the world. This whole department was one of deep interest, and received a large share of attention from scientific men from all countries. Mr. E. T. Sweet, a man thoroughly versed in the geology of Wisconsin, having spent some years with the geological commission, was in attendance during the entire six months with this exhibit, and gave visitors much valuable information in regard to the vast and varied mineral resources of the state.

EDUCATIONAL EXHIBIT.

In the Main Building was the exhibition of the educational advantages of the state. This exhibit was prepared under the immediate supervision of Prof. Edward Searing, state superintendent of public instruction, and was gotten up with special care; and it proved a very satisfactory representation of this extremely important interest. It compared favorably with the educational exhibits of the other and much older states. Hon. Willard H. Chandler devoted considerable time with this department, and was useful in explaining to visitors our enlightened educational system.

ART GALLERY.

In the Art Gallery, Wisconsin was represented by a full-sized marble statue — *The West* — by Miss Vinnie Ream, a native of the state; by busts, medallions and crayon portraits, by Miss Fillans; and, during the latter part of the time, by magnificent paintings of Lakes Monona and Mendota, with a view of the city of Madison and the State Capitol, by Thomas Moran, Esq., a celebrated landscape artist.

DAIRYMEN'S ASSOCIATION.

In the Dairy Department, Wisconsin stood pre-eminent. At the June exhibit, she had by far the largest number of cheese of any state, and it was of superior quality. Nor was there wanting a large supply of excellent butter. Our state took more awards in this department than any other state. This exhibition was under charge of the State Dairymen's Association, and was, in every respect, creditable to the members of that association and to the state.

HORTICULTURAL SOCIETY.

The State Horticultural Society made an excellent display of fruit. It presented over two hundred varieties of apples, and pears, crabs and grapes, etc., in great abundance, and of superior quality. This exhibition was unexpectedly good, and attracted much attention from visitors.

HORSES AND SHEEP.

In large draft horses, Wisconsin took the palm. Mr. Geo. Murray, of Racine, exhibited a Clydesdale horse that was universally acknowledged the best on the ground of this class.

The State Sheep Breeders' Association made a very excellent show of sheep — equal to any on the ground. A goodly number of sheep were exhibited, and they were all of superior quality. This exhibition gave ample proof that Wisconsin has few, if any, superiors as a wool-growing state.

INDIVIDUAL EXHIBITS.

The individual exhibits from Wisconsin were quite numerous and attractive. Agricultural implements of all kinds, mill, and various articles of other machinery; leather, and many other interests were fully represented, by superior specimens. This is shown by the large number of awards given to our state.

WOMEN'S PAVILLION.

This article would be far from complete if no mention were made of the splendid exhibition presented by the women of Wisconsin. Soon after the organization of the United States Centennial Commission, a national organization of the women of the country was perfected. Mrs. E. D. Gillespie, of Philadelphia, was placed at its head, and a chairman for each state was appointed. Mrs. A. C. Thorp assumed the duties of chairman for Wisconsin in March, 1875, and soon appointed assistants in various parts of the state, when active work was commenced. This organization of the women was efficient in both nation and state in arousing an interest in the general purposes and objects of the Centennial Exhibition; and it culminated in a very superior representation of women's work in the Women's Pavillion on the Centennial grounds; in this pavillion, Wisconsin women occupied a proud position. By common consent, their articles were pronounced equal at least to those

exhibited by any other state. The designs of the articles presented by our noble women were elegant, and the execution was worthy of the designs. The arrangements of the several exhibits in the various cases in the pavillion indicated very superior skill and taste; and the women of Wisconsin are to be congratulated upon their complete success. The Memorial Shrine, the Beloit College Medallion, the Art Easel, the Cabinet, the Illustrated Poem, the Dante Album, and numerous paintings and elaborate pieces of needle work, presented by the women of this state to the Centennial Exhibition, will long be remembered with pleasure by all who visited the Women's Pavillion. These articles were extremely attractive, and reflected the highest credit upon those who were instrumental in their preparation.

A GRAND SUCCESS.

A general idea of the part taken by Wisconsin in the great International Exhibition is thus imperfectly sketched. Nothing like justice could be done in an article suited to the limits allotted to this service in this volume. As a whole, the Centennial Exhibition was a grand success. It was in commemoration of the grandest event known in history; and, as an exhibition, was the most magnificent in all respects that has ever taken place in the world.

CONCLUSION — LIST OF AWARDS.

This article cannot be concluded in a more appropriate manner than by inserting a list of the several awards given by the Centennial Commission, for articles presented from the state of Wisconsin. The list, so far as is now known, is as follows:

- State of Wisconsin, for collection of minerals, rocks, etc.
- State of Wisconsin, for War eagle, Old Abe.
- State University, Madison, volumes of catalogues, regents' reports, important representations from its mineralogical collections, etc.
- State Historical Society, Antiquities of Wisconsin.
- State Agricultural Society, Complete set of its transactions from 1851.
- State Horticultural Society, for collection of apples.
- State Department of Public Instruction, educational charts, statistics, reports, etc.
- Wisconsin Central Railroad Company, Wisconsin woods and planks.
- Board of Education, Milwaukee, reports of pupils' work, etc.
- J. I. Case & Co., Racine, ten-horse power threshing machine.
- A. P. Dickey & Son, warehouse and farmers' fanning mills.
- Edward P. Allis & Co., Milwaukee, sawing machines.

Edward P. Allis & Co., Milwaukee, milling machinery.
 Edward P. Allis & Co., Milwaukee, cast iron roller cylinder mill.
 Geo. Esterly & Son, Whitewater, harvester reaping machines.
 Winchester & Partridge, Whitewater, plantation and freight wagons.
 Racine Hardware Manufacturing Company, ferneries, aquariums and flower stands.
 Fish Brothers, Racine, farm wagons.
 Kenosha Fanning Mill Company, Wisconsin fanning mills.
 Freeman & Smith, Racine, brackets, boxes for window plants, etc.
 Eclipse Wind Mill Company, Beloit, wind engine.
 George Richardson, Milwaukee, carbonized artificial stone sewer-pipe and pipe mould.
 Otto Zwietusch, Milwaukee, chemical fire extinguishers, soda water apparatus, glass faucets.
 James R. Luce, Stevens Point, portable saw mill and stroke power.
 Phillip Best Brewing Company, Milwaukee, lager beer.
 Valentine Blatz, Milwaukee, bottled lager beer.
 Valentine Blatz, Milwaukee, lager beer.
 Joseph Schlitz, Milwaukee, lager beer.
 A. F. W. Bodden & Co., Milwaukee, vinegar.
 Miss S. F. Boëtter, Beloit, needle work.
 Lena Fuldner, Milwaukee, needle work.
 St. Rose Orphan Asylum, Milwaukee, needle work.
 Geo. T. Murray, Racine, Clydesdale stallion.
 Zebina Wilson, Palmyra, cheese.
 William Stowe, Whitewater, cheese.
 C. Marshall & Co., Whitewater, cheese.
 Concord Dairy Association, cheese.
 A. De Land, Sheboygan Falls, cheese.
 Daniel Kuntz, Sheboygan Falls, cheese.
 O. B. Bennett, Lamartine, cheese.
 A. D. Favill, Lake Mills, cheese.
 Morris Lemmen, Edward, cheese.
 H. F. Dousman, Waterville, cheese.
 A. H. Wheaton, Auroraville, cheese.
 Hiram Conover, Plymouth, cheese.
 Carl Riche, Sheboygan, cheese.
 Smith & Gates, Sheboygan Falls, cheese.
 Smith & Gates, Young Americus, Sheboygan Falls, cheese.
 McCutcheon, Marshall & Co., Hebron, cheese.
 W. C. White, Kenosha, cheese.
 C. Hazen, Lodi, cheese.
 M. N. Seward, Lake Mills, cheese.
 Mather Brothers, Sheboygan Falls, cheese.
 N. Morely, Baraboo, butter.

R. S. Houston, Kenosha, butter.

S. Faville, Lake Mills, butter.

J. J. Smith & Sons, Tomah, butter.

Benj. Holmes, Ft. Atkinson, butter.

J. H. Paul, Genesee, American Merino Ram, 1 year old; also, 2-years old and three yearling ewes — three awards.

P. Humbert, Caldwells Prairie, three yearling ewes.

Geo. Lawrence, Jr., Waukesha, Merino sheep.

There may have been other awards that have not been obtained.

ADDRESS.

BY HON. E. E. CHAPIN.

Delivered at the Fond du Lac County Fair, September 28, 1876.

Mr. President, Ladies and Gentlemen: Agricultural and Mechanical Societies — County, District and State Fairs, for the exhibition of produce, live stock, farm machinery, manufactured goods, wares and merchandise for competition and premiums are not aged institutions.

A quarter of a century ago, not one in a thousand would have believed that the golden harvest would bow to American inventive genius—would fall before the triumphant march of farm machinery. One-half a century ago not one in a thousand would have believed that the vast carrying system by steam and rail, or news by lightning, would be a grand success in this our day. A century ago *science* in agriculture was unknown. But tilling the ground, keeping of sheep and herds, is old as the garden and fields of Eden.

ANCIENT FARMERS.

Adam and Eve were happy while they subsisted upon the spontaneous, unforbidden fruit which grew and ripened within their reach. But they and those who followed became miserable and unhappy because of the famous general order No. 1 — “work,” “sweat,” “eat.” Adam was driven forth from the garden to the field, to till the ground, to work without hoe, ax, hammer or tool of iron; and Eve to make bread without yeast, and biscuit without

baking powder. The farmer and farmer's wife were then indeed objects of pity. Their great Creator held them in contempt. Their son Abel, the keeper of sheep, was slain in the field, and "Cain the tiller of the ground" became a hardened tramp. Agriculture had a bad beginning. It had the worst kind of send off. Everything seems to have been done by hand. Agriculturists were not bettered by the deluge, although wicked sons of wicked sires and *giants* were washed from the face of the earth. No sooner had Noah landed upon the mountains of Ararat than he became a husbandman, and planted a vineyard; and from the first crop he became drunken with wine; and out of his debauch came the well known curse on Canaan: "A servant of servants shall he be unto his brethren." The deluge and ark may have been a benefit to commerce and navigation, but not to farmers or farming. For centuries long, agriculture, the art of cultivating the ground and obtaining from it the products necessary for the support of animal life, was the main support of man. In vain you turn the pages of holy writ under the old dispensation to find prophet, sage, judge, leader, prince, or king, who was not possessed of land, sheep, cattle, and other stock. Abraham and Lot owned flocks and herds and were rich in silver and gold. Jacob, the father of Israel, who in his youth, had his wages changed ten times by the farmer Laban, had many cattle and sheep. In fact he was a breeder of ring-streaked, spotted, speckled and grizzled cattle and smut nosed sheep, Short Horns and Southdowns. Gideon, the mighty in battle, was threshing wheat by the wine press when called by the angel of the Lord to save Israel from the hands of the Midianites. Elisha had the mantle of the prophet's office cast upon him while he was plowing with twelve yoke of oxen, while he was running a breaking team in the valley of Jordan. The honest old farmer Boaz owned the wheat field where the beautiful Jewish maiden gleaned and made the reapers and Boaz happy. David the slinger and the singer, watched and fed his sheep, his ewe lambs. Job had flocks and herds, boils and patience; yet he left for anxious heirs 14,000 sheep, 1,000 yoke of oxen, and great numbers of other live stock. The birth of Christ was first announced to shepherds abiding in the field watching their flocks by night. Shepherds first heard the heavenly host sing that mighty chorus, "Glory to God in the highest, and on earth, peace, good will toward men." Other Bible

incidents might be named; other eminent farmers not of the Bible from Cincinnatus down to farmer Taylor, might be mentioned. Their beginnings and endings, their successes and failures, their trials and triumphs. So, too, might be mentioned other ancient and modern examples; men who despised the command "work" and took to their nets beside the sea, to the woods for game, to the cities for trade; to other vocations, professions and to politics. But when or where, from Adam's day to the present, is recorded a single instance of a successful escape from that command "work?" And the world to-day is on a high plane of civilization, by reason of that command — by obeying it in field and shop, by brain and muscle.

DISTRIBUTION OF LABOR.

Nations have become civilized, prosperous and wealthy just as the agricultural conditions of those nations have prospered. The first great wants of the people are food, clothing and shelter. People must be fed and clothed before they can turn their attention to other pursuits. But it does not follow that all men must be farmers. Labor must be equally and fairly distributed. The United States is amongst the foremost nations of the earth, and it is generally conceded that labor is fairly distributed within our borders. Of the 12,500,000 persons engaged in all classes of occupations, nearly 6,000,000 are engaged in agriculture. The great Northwest raises wheat, butter, cheese and meat, daily food for themselves, and millions for exportation; and yet not one-half of our vast farming land is developed, and not one-half our laboring people are engaged in farming.

The national census of 1870 enumerates 2,660,000 farms, more than one-half of which contained over 50 acres. The cash value of these farms, farm implements and live stock was placed at upwards of \$1,000,000,000, and the total annual production at about \$2,500,000,000.

ANCIENT AGRICULTURE.

We have been led to believe that ancient Egypt was the granery of the world. Egypt had her Nile and a system of irrigation beside the regular annual overflow of the river to enrich her soil. Her agriculture was mainly under the direction of the Government. She fed the millions of her own land, and had much wheat and

corn to spare. She kept a seven years reserve on hand in case of "war, pestilence or famine." But how insignificant she appears. Temples, theatres, pyramids, canals, and all, when we consider that this wondrous land, this prosperous and productive Egypt, contained in square miles, square acres less than one-fourth the territory of Wisconsin. Her only farming implements were the yoke, a crotched stick or a pick for a plow, and the sickle. Although in some instances we read that the husbandman had only to scatter the seed, turn on a herd of swine to tread it in the earth, and await an abundant harvest. Such was ancient Egypt — the agricultural garden of the world. Greece caught the spirit of agriculture from Egypt. Agriculture flourished in Greece a thousand years before Christ. Here agriculture gradually advanced until it attained a high degree of perfection. The Greeks had breeds of cattle, horses, sheep and swine unsurpassed by any nation of antiquity. They also raised the apple, pear, peach, plum, cherry, grape and quince. They had many quaint or odd implements of husbandry. They had a form of plow which they considered an improvement on the crotched stick. Some of their farming implements have been used as models to aid our American inventive genius. The Greeks of history were not agriculturists. The cultured Greeks took more pride in building cities, in music, science, painting, poetry and philosophy. The Greek farmers were a subdued menial race, slaves. They were looked on with contempt by the poets and philosophers, by the solons or law-givers. The ancient Greeks were devoted to commerce. They could exchange other articles for grain, at a cheaper rate, or as they claimed with greater economy than their slaves could produce it from their thin, hard, intractable soil and hilly country, or to reclaim and till the swamps and morasses.

Rome rose on the ruins of an ancient Greece. Agriculture became a source of pride with the Romans. For a long time agriculture was the favorite pursuit and fundamental idea with the wealthy and noble Romans. The greatest praise which could be bestowed upon the ancient Roman was, "he is a good hushandman." For a century preceding the Christian era, the agricultural literature of Rome was unsurpassed by that of any other country, ancient or modern, except, perhaps, the present of the United States, France or Germany. Agriculture was reduced to a system. Farms were

limited to seven acres at first—subsequently to fifty acres, then later to five hundred acres—“the large fish gradually consuming the small ones.” In the early days of the Roman Republic, agriculture was honored and followed as an avocation by noble Romans who had distinguished themselves in other walks of life—as soldiers, as statesmen. This was the time when commerce was considered low and degrading by the Romans; when war and agriculture were considered high and noble occupations—the farmer thinking himself justly able to defend his farm—but when luxury, lust, love of empire, seized the Roman mind, agriculture was entrusted to the bondmen who had no interest in the soil they tilled, and agriculture, as an art, went with the empire to ruins. Southern Europe was overrun by the barbarians from the north, and from the 5th to the 16th century, agriculture was in a wretched condition.

During the long night of the middle ages it groped its way with ignorance, bigotry and superstition; it had only an enforced existence; it afforded a hateful and stinted supply to man and beast. The worst of villanage and serfdom prevailed. The masses were in most miserable circumstances. And when it was ascertained that no deluge would again come to wash landlord and villain from the face of the earth—no “brimstone and fire from the Lord out of heaven to destroy the cities and all the plains, all the inhabitants of the cities, and that which grew upon the ground,” then it was that efforts were made by the more intelligent to lay a foundation for civilization and progress. Villanage and feudal despotism began to disappear at the beginning of the 16th century. The art of printing had been discovered. A new world had been found. The Reformation had overrun nearly all Europe. Mental activity, intellectual vigor, had stimulated search for knowledge, and all classes of society began to improve. Agriculture, however, made slow progress through the 17th and 18th centuries.

AGRICULTURE AS A SCIENCE.

Ages and ages had rolled away before the light of science dawned upon the agricultural world. In 1776, Arthur Young wrote in his “Annals of Agriculture,” in substance, that agriculture could not rest upon a solid basis regulated by just and accurately drawn principles without the chemical qualities of soils and fertilizing properties being well understood. This led to an investigation of the ele-

ments of the soil, and finally resulted in the application of the science of chemistry to the improvement of agriculture. Tilling the ground as hand-work — as guess-work — as my-father-told-me-so, began at the very beginning of the 19th century to surrender to “book farming,” hand-work began to surrender to brain-work, man-work to horse-work and machine-work, and to-day we are in the enjoyment of the full fruition of agriculture as a science. We hail the day with joy and gladness. It is the glad tidings to us all in this centennial year of our great republic. It is a component part of our grand civilization. There is not an intelligent farmer within the sound of my voice but can give the book theory and practical knowledge of the fertilization of soil, tillage, rotation of crops, drainage, nutrition and fattening of stock, production of wool, butter and cheese, the breeding, rearing and use of horses, cattle, sheep, swine and other domestic animals, pastures and meadows, kind and quality of grains and roots, and their economic uses, planting, sowing, harvesting and marketing. Why? Because agriculture has been reduced to a science. We have to-day all the opportunities for the successful management and culture of farms.

THE PRESS.

We have the press. We can not do without it, whether we be farmers, lawyers, teachers, doctors or mechanics. The agricultural newspapers or journals are a power in the land. We have to-day over 100 agricultural and horticultural newspapers and journals, with an aggregate annual issue of nearly 22,000,000 copies, and this does not include the many columns devoted to “field and farm” in each issue of the thousands of the weekly newspapers in our country. There are doubtless many in my hearing who can recollect the time when there was but *one* agricultural journal published in the United States, *The Cultivator*. It was good in its day. Compare some one of the early numbers of that old pioneer journal with the enterprising agricultural newspapers of to-day, the *Live Stock Journal* for this month for instance, which contained over twenty cuts of animals, including a very correct and faithful picture and history of J. I. Case's celebrated Gov. Sprague, the \$27,500 horse.

WORTHLESS AGRICULTURAL LITERATURE.

The other day an intelligent farmer remarked to me that the farm-

ers as a class were being burdened with worthless, worn out agricultural literature, in worthless agricultural newspapers; "much of it" he said, "was got up like the man's razors to sell, not to sell to boys, but to grown men. They are filled with quack doctors advertisements, rare chances to make \$75 a month, new and useful gang plows, lightning rods, hens' eggs, China potatoes, chromos, and the like, and where a farmer has a family of boys who are looking away from the farm for a money making business it works mischief, and requires considerable time to explain away the dazzle."

You know whether my friend's statements are correct or not. If they are, let your voices be raised against it, if you dare. Editors are men of enterprise. Their enterprise is commendable. But if villainous compounds are advertised for pay, and you know it, you need not spend your time in reading, nor in taking the stuff. There is enough else to read; you had better read the patent office report which Gen. Bragg will surely send you when he is squarely in his congressional chair.

THE RESPECTABLE PRESS has given to the farmer, to all classes, wisdom, knowledge, power. It has elevated the social, moral and intellectual condition of the race. It is the great schoolmaster abroad. We had better have been without this centennial year, than without the press.

AGRICULTURAL SCHOOLS AND COLLEGES.

Only thirty years ago the first actual professor of agriculture was appointed in an American college. Now we have similar professorships in nearly every first-class college in the Union.

The "scientific course" in our colleges and state universities is conceded to be the most popular course amongst all, save, perhaps, the old Greek and Hebrew scholars and superannuated clergymen. Why? Because our boys and girls do get a little common sense mixed in with their education.

There are now in existence about forty agricultural schools, aided by private and state aid, in the United States. Their influence is seen and felt throughout the land.

I believe our sister state, Michigan, has the honor of establishing and putting into successful operation the first state agricultural college in America. It derives its entire support from the government. Prof. Daniells, of

OUR STATE UNIVERSITY,

is working industriously, as professor of agriculture and chemistry to give a thorough and extensive course of scientific instruction, with constant and direct reference to its practical application to the farm and wants of the farmer.

The university farm is used in experimenting in agriculture and horticulture — farm and garden products of this climate. Would your boys be educated in the science of agriculture, place them under the care of Prof. Daniells. Would they be educated for trade, commerce, professions, agriculture? Don't look away to Yale or Oberlin — to Princeton or Cornell — to Dartmouth or Cambridge; but rather to our own State University — its college of agriculture, its college of arts, its college of science, its college of letters, its college of law. Look also to Ripon, Appleton, Beloit and Milton. We have institutions of learning at home. We have the best system of public schools, the best seminaries and colleges in the land. Let us nourish and protect them, before we go to other states, other countries, to build up them and theirs.

AGRICULTURAL SOCIETIES.

Agricultural societies are of recent origin. The first agricultural society of which we have any record was established in Philadelphia in the year 1785 — nine years after the Declaration of Independence was given to the world. The object sought was to awaken an interest in the subject of agriculture and spread abroad useful information. Within a short period of time after the organization of this first society, others followed. They, however, were experiments. They were as skirmishers for the grand army of agricultural societies soon to follow. It was an earnest, anxious effort of the learned few to organize these societies for the purpose of promoting the highest interest of the people, by the improvement of their minds in the pursuit of agriculture as a science. But the farmers of that day were not all learned. "Book farming" was rejected; and these agricultural societies were the direct progeny, or offspring, of book farming.

The advent of book farming among the masses was dreaded, abhorred! Not the potato bug, not the grasshopper, nor the chinch bug of to-day, is more dreaded or feared by mortal man, or woman,

than the chemistry of agriculture and agricultural societies were feared and dreaded by the farmers of three-quarters of a century ago. For ages and ages the old wheel of agriculture had run in the same old rut; and the husbandman of the days of the last war with Great Britain who dared to make experiments outside of the old, old way — who dared to do otherwise than his great-great-‘granfer’ had done — who dared to store his mind with useful knowledge — who dared to imbibe a liberal idea, and who dared to join an agricultural society, so excited the prejudices which blinded his neighbors’ eyes that he became the object of ridicule and the cant of his entire neighborhood. The education of the masses had to be begun at home. Competition, with just enough of premiums to stimulate the farmer of that day, under the name of fair, did the work.

ANNUAL FAIRS.

Fairs, or exhibitions of farm products, live stock, farm and mechanical skilled workmanship for competition and premium, because fully established shortly after the close of the last war with Great Britain, and in the year 1825 there were a number of fairs in existence. Agricultural and mechanical associations are now permanently established and their fairs are well sustained in every county, district and state, in free and independent America. What a growth! The work of fifty years! What are they? What is the object of these exhibitions? What do they do? They are the means of bringing farmers, mechanics, merchants, professions, trades — every interest, communities of interest together, of exchanging knowledge — of improving, encouraging and building up the backward to higher attainments; and of stimulating the advance to greater improvements; to further progress; to higher and nobler aspirations. Such is the purpose of the Fond du Lac County Agricultural and Mechanical Society, the twenty-fourth annual fair of which is being held here in your thriving, populous, commercial and manufacturing city to-day. If any one of the originators of fairs could look in upon this exhibition of the products from field and shop, what could he recognize here that belonged to the day in which he lived? Where is the old bull plow? Where the tree top then used for a harrow? Where the sickle? the one nibbed scythe snath? the flail? Where the ox cart? the thorough brace pleasure

wagon? the long sled? Where the spinning wheel? the distaff? the hand cards? the loom? the fire place? the hand irons? the crane? the dye tub? the brick oven? Where the well sweep? the old oak-en bucket that hung in the well? Where the hard bluish green crab apples that grew on the flat? the natural fruit? Where the old fashioned reds and merino potatoes? They have gone — all gone — never more to return! Go over these grounds, through these buildings, on the track. You see a live fair, you see modern articles on exhibition. You see products of the season, selected and prepared for the fair. You see animals groomed, trained or fattened to please the eye. You see new machinery, farm implements which were never used in the field. Things of the present — the pride and spirit of 1876! You look in vain for things of the past; if any you find, they have the new improvements properly adjusted. You look in vain for rusty machinery, for poor animals, for rejected wheat, unfilled corn, bleached barley, shrunken oats, gnarly fruit, decayed or withered vegetables, tainted lard, strong butter, musty bread or skimmed milk cheese. These are not at fairs, although they are sometimes found in the market.

THE BOYS' HOE.

Neither do you find at the fair the worthless old hoe, which the boy so industriously used and manfully kept up with the man. If not at fairs it is not forgotten. Well do I remember the hoe I used when a boy. It was heavy, dull and rusty; it had a badly battered eye, a handspike for a handle, a slippery wedge, with nearly a pound of long and short nails to support the wedge; this to keep the hoe on the handle, and even then the handle had a weakness to turn at the eye; and with this formidable implement of husbandry it was expected that I should keep up with the men, who used the swan-neck light steel hoe. Then too, that old corn cutter, a piece of broken scythe stuck into six or eight inches of apple tree limb, for a handle. These implements are never seen at fairs, are never "brought out" as the good Sunday school teacher says, only when work begins. These "banged up" farm implements, and the old sheep skin which the good and faithful farmer boy straddled while riding horse to plow out corn under a scorching sun, are economically put aside and kept for another purpose.

TO ENCOURAGE BOYS TO STICK TO THE FARM.

This large economy has been the direct means of "bringing out" very many substantial merchants — number one merchants, qualified teachers, good lawyers and excellent judges, and many hard tramps. Can you tell me where or in what manner the inventive genius of this age ever aided a boy, while a boy?

WHAT BOYS DO.

So little thought is given to boys, so horribly are they banged around on the farm, that I am constrained to believe that some of our farmers (I don't think you have any here) have forgotten that they once were boys. Did it ever occur to you what the general run of farm boys do? What don't they do? In the morning, he is the first one called, and it is not late either. Whether to awaken the household, or to churn, I never knew. It is no subdued call; it is earnest and inspiring. It can be heard. It is his early start on the high road to fame — to habits of industry, to greatness, to renown. He is up. He churns, he milks, he drives the cows to pasture, he cuts up wood and carries it in, and helps to do up the other chores before breakfast. How bright the day of labor shines out before him. He is in the field at work, with the same old implements so long ago put away for him. He keeps up with the men and is told how smart he is. This is encouraging. And when the day's work is done by man and beast, the boy has work to do. The cows are to be driven from the pasture and milked (how my hand cramps when I think of him). By the time the other chores are done he is a poor tired out boy. These are the ordinary duties of the general run of farmers' boys. Who knows this better than the boy, or his mother, there. The boy never forgets his mother, her kindness, her sympathy, her love! God bless the mothers of our farmer boys! She knows their ups and downs, their joys and sorrows, their trials and triumphs. She knows that it is no joke to be a farmer's boy.

It is not surprising then to find the farmer boy reading up "the way to make money," in the *Prairie Farmer* or other agricultural newspaper, on Sunday, his only day of rest, while his devoted sire is in yonder sanctuary joyfully singing, "Praise God from whom all blessings flow." Many a good farmer has been spoiled by an over-

tasked, overworked boyhood. Fairs were not originated for boys, but for *men and women*. Boys are only permitted to attend upon good behavior.

Boys, a better day is coming for you. You will soon be on the stage of active life — and then, you will be the actors, and I pray you, don't forget, that once, you were boys.

WHAT SHOULD, AND SHOULD NOT BE DONE.

Managers who get up and support our Annual Fairs are entitled to great credit. Their time is freely given, not for money, not for glory. They are at work for the public good. They are striving for improvement, not in farming alone, but for better results in the several departments of industry. They are striving to give each interest the encouragement it demands; and, "if I may be permitted to venture a word in season," as the actor in "Kerry Gow" says — let me say to you as I would to every person who attends the several annual fairs in the commonwealth: Give these gatherings your support; give them your presence, your heart and hand. Don't be stingy; don't try to "beat" the society out of a penny. Don't venture upon the grounds with *one* season ticket which your neighbor and his family, his mother-in-law and her family, have used in quick succession. Don't enter for competition and premium an "old plug" of a horse, or a "pair of old plugs," just to obtain stable room and forage while the fair lasts, if you have a poor relation in town to visit or a nickle left. Don't curse the officers of the society for charging an entry fee. Don't curse the secretary of the society because he cannot do two things at once, or be in two distinct and different places at the same time — or because he does not pay the premiums before the judges announce the award. Don't charge the managers with originating a scheme to fleece the farmers. Don't charge the executive board with being a ring, for wrong, roguery and robbery. Don't curse the superintendents of the respective departments because you think that your products or wares from farm or shop do not occupy the best place for exhibition. Don't grumble at the judges because you failed to receive the *first* premium on every article which you have brought for exhibition, competition, premium. Don't swear because another horse made better time than yours. Don't, I pray you, don't, swear because this speech is brief, is long, and filled with nothing new, but do remember

THE OBJECTS SOUGHT TO BE ATTAINED BY YOUR ANNUAL FAIR.

A fair, honest competition in the display of the products from your farms and gardens, from turf and field, from hearth and home, from store and shop, from brain and muscle; not for *dollars in premiums*, but for the growth and prosperity of the different branches of industry within your midst; for the benefit of agriculture, the mechanic arts, manufactures, trade and commerce. Remember that annual fairs bring all classes together for a common purpose, for friendly intercourse and relations which beget mutual respect and intelligent co-operation. Remember they bring relaxation from toil and recreation of our hard-working men and women, and give them an opportunity for enjoyment and instruction. Remember they bring reforms in agriculture, in raising stock, in growing produce for man and beast, in making butter, in manufacturing cheese, in the improvement of farm machinery, in easing the labor of life, in stimulating the inventor, the mechanic, the manufacturer to greater effort. Remember they bring models of excellence from nearly every branch of industry to awaken enterprise and energy in the slow-going, less informed farmer and mechanic, and to stimulate the fast-going, the advanced, to higher achievements. With these remembrances uppermost, the success and perpetuity of the Fond du Lac County Agricultural and Mechanical Society is assured, and your fairs will be held from year to year for ages and ages to come with undiminished zeal.

WHAT HAS SCIENCE DONE FOR FARMERS?

BY B. S. HOXIE, COOKSVILLE.

In our day we have much talk about science. Science of government, of commerce, of astronomy, of botany, geology, mineralogy, philosophy and chemistry. Go where we may, or in whatever direction we may turn, in the realm of space or ocean depths, to the highest mountain or lowest cavern, an unvarying law governs all; and the scientific explorer in either or any path of nature digs and delves with thought and fact to analyze a system which may be demonstrated, and then he calls it the science of —.

In short, the tendency of our time is to reduce everything to a science. And we find this science to be opposed to something which we call practice; seemingly a contest between the two, as though one was antagonistic to the other, when possibly if the mists were cleared away which surround the contestants, they both may be found wearing the true blue of a common cause, with objects and aims the same.

Then we have chosen for our theme to-night the "Farm," and ask, Has science done anything to benefit the farmer and dairyman?

We sometimes hear people sneer at what they call book farming, and ridicule the idea that a man can be a scientific farmer, when in fact, what they call science and book farming is only practice reduced to a system, and the farmer and dairyman coming so close in contact with nature, should of all men become most familiar with nature's laws. Husbandry, or the rearing of cattle and sheep, was man's most primitive occupation. He knew the effect, but did not give much thought as to the why of the law, or the cause which produced certain effects. Nature has furnished us with the grasses, and the animal machine for converting them into a more concentrated form, called milk, which nature alone can furnish. Here, then, we are profited by the works of nature in our fields and in our animals.

But if we go one step further and wish to convert the milk into another substance such as butter or cheese, we in one sense become a scientist. Natural science, you say, because we do it by a natural law. Then what is science? It is simply knowing, and the science we meet with most frequently is the science of understanding nature in her varied forms. And to reach this natural science, we must ask of every object which comes before us: What is it? How came it where it is? What can be done with it? And the correct answer to all these questions composes the whole of what is termed natural science. If we ask, then, what has a farmer or dairyman to do with science, it would be the same as to ask, what has a man who works by natural laws to do with a knowledge of those laws? For example, the dairyman's aim and object is to produce milk, and all things considered, he who produces most milk from his herds is most successful. But how shall he increase the yield of milk? Perhaps he may improve his pastures by sowing a variety of grasses in place of only one kind. Then he profits by

the science of botany. He may stimulate the grass by the use of fertilizers; then he ministers to plant growth by the law of chemistry. But suppose his pastures are all right, and the milking machinery defective—for herein lies the difference between profit and loss—then the truly scientific, practical husbandman will take advantage of that subtle branch of natural science, which has taught us that desirable traits may be preserved, transmitted and promoted by an intelligent breeding. Then we say the man who produces the most beef from his herd, or the most milk from his dairy, is the one who makes the best use of these forces in nature. And the farmer who raises the best stock, raises the best crops, and keeps his soil and farm in the best condition, is the most scientific farmer. You may call him the book farmer, or any other name you choose; nor does it make any difference by what process he has reached these results.

It has been attained by a conformity to natural laws upon scientific principles. There may be, and generally are, several ways of reaching the same facts and arriving at the same results, but he who gets them, understands them and profits by them, is the scientific man. Jacob, of ancient time, understood some of nature's laws, and profited by them in a scientific way, to the disadvantage of old Laban. It might have been considered a little sharp practice, but it was scientific nevertheless. So if we depend upon nature, we must understand the principles which govern and control nature. Education is not always science, for many who are skilled in book lore are far from being wise, and hardly have the practical sense to earn a livelihood.

But if the truly practical and the truly scientific man talk about the same things, they will reach the same results, for truth is truth, wherever you find it. Science teaches us that by intelligent selection, it is possible to determine quality, and with care we can reach the highest results to be attained by the race or species, either in plant or animal.

The chemist, by an analysis of plants and soils, tells us of the component parts of each, and the adaptation of one to the other, and by pointing out the defects, we are enabled to supply the lacking elements, and by scientific practice determine what is the best stimulant, or plant food, for each part of the farm.

It is to the science of chemistry that we are indebted for all the

facts necessary for the farmer and dairyman, in relation to earth, air and water, and the constituent elements of each. How that vegetable growth will absorb or throw off the gases of the atmosphere; that the growth of one must take the place of the decay of the other, to keep the atmosphere in the best condition for man and the animals. Chemistry tells us that about ninety-five per cent. of plant growth is from the atmosphere, and practical science tells us that the soil must be in the right condition to absorb these elements from the atmosphere, and retain them for the use of plant roots.

Actual facts and your own observation have shown that of two adjoining fields, with the same soil, one kept in good tilth, with no more artificial fertilizers than the other, one will produce good crops with a profit to the owner, while the other is starving the owner and the soil both at the same time.

Science teaches us that plants elaborate in their cells, from the crude inorganic matter which they take up, certain materials necessary to the formation of fat, muscle and tissue, which are all needed to build up the waste constantly going on in the animal. The chemist can tell us what is needed in the soil to produce all of these in the plant, but the chemist cannot always detect or tell the difference between primitive or progressed matter. Thus the phosphate rock of New Jersey shows precisely the same percentage of the phosphate of lime that bones do, while one is food for our plants and the other is not.

There would seem to be a conflict here if we did not look a little further to understand the cause. Science also teaches us the progression of the primates and that the lower orders of plant life, by their life and decay, will afford food for a higher form, and that in turn to a still higher, until we have in one kind of food for man or animals, many or all of the constituent elements of thousands gone before. We know these elements all to exist progressed or unprogressed in the earth, air or water ready at our command to do our bidding, and practical science tells us how to increase the power of each by the use of proper stimulants, and if our soil lacks silex in the proper form to be assimilated by the crop of wheat, or oats, we must apply it in the more progressed form of potash, or raise crops that will in time overcome this defect, in that particular locality. The value of manures of the different kinds is not so much the real

value in and of themselves, as fertilizers, as it is the power which they possess to stimulate the matter of the soil where they are supplied.

The theory advanced by some that our soil is worn out or exhausted for certain crops is only true in a small degree, for an analysis of those soils shows the same elements to exist now that did years ago, and in sufficient quantities to produce hundreds of crops. The only difficulty is, the elements are not in form or condition to be taken up by the plant we wish to produce.

For want of this scientific knowledge many a field in the southern states has been abandoned to grow thorns and briars instead of bountiful crops. This food of plants may be illustrated somewhat by the food of our animals.

For instance, the analysis of a bushel of carrots shows that as compared to a bushel of oats or corn, they contain only a small part of actual food capable of building up fat, bone or muscle, but when fed in connection with either, they afford a stimulant necessary to the healthful digestion of other food. Old time farmers used to tell us to summer fallow or our fields would be worn out. Scientific practice says use proper fertilizers and a rotation of crops, for we can hardly afford to let one third of our fields lie idle under the mistaken notion that they have got tired and must rest.

There is perhaps no occupation of man which requires more careful thought, and study of natural laws, and confidence based upon those laws, than agriculture, and yet how sadly neglected is this branch of education.

It is not my intention at this time to give a dissertation upon the production, care or treatment of any particular crop on the farm, but simply to show that knowledge of the how and the why is quite as essential as the labor bestowed upon its production. My own observation and yours is to this fact that he who puts the most thought and the most mind into his business is the most successful in his chosen occupation.

I shall now speak more particularly of some of the practical results of these rules as applied to dairying and the rearing of cattle, for if science points out and determines the condition, qualities and effects of earth and air, upon plant life, how much more, and in a greater degree does it determine the loss or profit to the farmer and dairyman, in the kind and condition of cows and bullocks which he raises on the farm.

Dr. Stephenson, of Indiana, in speaking of his own practical experience, says: "I purchased one hundred calves of all grades from scrubs to high grades, and a few thorough-breds, which I did not care to breed from; they were all summered and wintered together, with the same care and same feed, when fifty-one choice steers were selected and sold which averaged 1,370 pounds each. Two short horns from these were found to weigh 1,570 lbs. and the other 1,600 lbs. or fourteen per cent. more than the whole lot including themselves. One of the scrubs was then reweighed and found to be only 1,150 pounds, or twenty-eight per cent. less than the short horns; the purchaser declared that the cash value of the short horns was at least thirty per cent. above the scrubs; this with twenty-eight per cent. would make fifty-eight per cent. in favor of the better breed. But this was not all, for a large portion of the scrubs was not then fit for beef. So much then where beef was the particular branch of the husbandry where the farmer was to be benefited by his skill and practical knowledge of science. Now let us compare again for milk. At the Togus farm in Maine, there are kept three herds of milch cows: The Holstein, the Natives, and the Jerseys which were considered some of the best of their kind. An accurate account of the weight of milk and cream was kept for the year, and the average pounds per day of milk was as follows: Holsteins was 15.82 pounds; Natives, 15.89, and the Jerseys 12.18 pounds. The cream of the Holstein was found to be 9.03 per cent. of the milk, the native 9.82 per cent., and the Jerseys was found to be 16.16 per cent., while the cream from the Jerseys was found to be far richer in butter qualities than either of the others; and actual tests have shown that this breed of cows has made one pound of butter from twelve pounds of milk, or an average of $10\frac{1}{2}$ pounds of butter per week for fifty consecutive weeks. Again another test was made. Fair Ayrshire cows were selected from a herd, which was noted for their milking qualities; the milk of each was weighed and kept by itself for a week, with the following results: No. 1 took within a fraction of forty-eight pounds of milk for a pound of butter; Nos. 2 and 3 thirty-one pounds, and No. 4 twenty-five pounds of milk for a pound of butter. Instances have been given where cows would give from sixty to one hundred pounds of milk a day for weeks and months in succession, with an enormous yield of butter in proportion. Mr. Hazen, of Ladoga, Fond du Lac county, says

he has a three year old heifer which gave on an average thirty pounds of milk a day through the best part of the season, and an Ayrshire cow which gave in one season 8,500 pounds of milk, and that it was a fact in his experience that a good cow would yield as much in value in one year as an average bullock would produce in beef in four years.

Now the practical man who has an eye for profit would not think of breeding the Jerseys for beef, nor for cheese dairying, and certainly it would be the height of folly to keep a herd of Jersey cows if he was supplying milk for the towns. But if he wants a nice little machine for converting grass into the best butter, then get the quiet Jersey.

A little incident showing practical science, or rather a lack of this practical common sense, once came under my own observation. A man who had plenty of means, while visiting one of our state fairs, saw a fine Durham cow, fat and sleek, which just filled his eye as the one for a family cow, while visions of oceans of milk and crocks of butter were floating through his brain; a bargain was struck at a high price and Miss Durham changed owners, and one of the largest sized milk pails was ordered from the tin shop to hold the lacteal fluid. I jokingly remarked that a smaller one would answer, and so, after a few days, as the small mess of milk seemed so lonesome in so much space, it was exchanged for a smaller and more convenient pail. That man's scientific knowledge of the requirements in a family cow was rather poor, and the ill-looking Ayrshire did not fill the bill for him. It has been shown as a fact that peculiar traits can be preserved and transmitted in a remarkable degree; and in no breed of cattle perhaps is this so peculiar as in the Durhams, while in some localities the finest milkers are produced, others as in some portions of Indiana and Southern Illinois, where beef is only produced; it is sometimes said that it takes two cows to raise one calf. And it would be sheer nonsense to import from that locality thoroughbreds thinking to improve our dairy herds thereby: For the dairy cow must be one which has the peculiar quality of converting food into an abundance of good milk without laying on an excess of fat. I have cited some special cases to show what breed and feed can do, for in my opinion the mainspring of success to the dairy farmer may be summed up in these two words; and it may be proper to give some of the average

results of actual values to the dairy farmer. From authentic reports furnished by the *Utica Herald*, for the year 1874, as the average yield from about ninety factories for eight months' time of running, was \$39.44 for each cow. One factory showed an average of \$55.07; the lowest in that factory was \$31.22. The highest yield in any one was \$90.59, while the lowest average cash from one cow was \$14.50. The average cash from those factories for the year 1875 was somewhat less, owing to the fact that the price of cheese has been less by nearly two cents per pound than for the previous year, but shows the same ratio of results. Now there was practice in that man's method who kept the cow that yielded in value only \$14.50 for eight months, but how much science did he possess which made him content to keep her. From Mr. Bois, of Marengo, Illinois, whose butter factory I visited a year ago last January, I have this statement. He says December 1st we had eighty-seven new milch cows, and thirteen farrow ones, and in one hundred and twenty-three days they gave 289,666 pounds of milk, or an average of twenty-six and one-sixth pounds of milk per day, with an average of about twenty-two pounds of milk for a pound of butter. It may be proper to add that Mr. Bois practices what may be termed winter dairying, considering this to be the most profitable for him; and at the time I was there, he was using the milk from nearly four hundred cows. In contrast with this average yield of milk in the winter months, I give the yield of milk from the herd of one man who sent milk to my factory last season. From twelve cows for one hundred and eleven days during the best part of the season, the yield was 20,573 pounds, or a fraction less than $15\frac{1}{2}$ pounds per day for each cow. Now if farming or dairying does not pay, which class of men are the first to find it out? I will give one more illustration to this part of my subject. Mr. Arnold, one of the best practical dairy-men of Herkimer county, New York, mentioned the case of one man who took five of his best cows from the herd, keeping debt and credit with them for the year, and found the net cash income on each was \$28.71. He also took five of the poorest, keeping the account in the same way, and found the loss on each to be \$7.05. Loss on five cows in one year was \$35.25, while the gain on the other five was \$143.55. Quite a difference, you will say, and yet it took the same care and feed for these less than worthless five cows, than it did for the other cows, saying nothing

of their market value, in case he wished to sell them. This man, no doubt, proved the old adage to be true, "that the half was better than the whole;" and possibly if our practice in other matters on the farm was reduced to a scientific system, it might be found true in more than one instance. It is too much the rule to count our crops by the acre, instead of by the bushel, and our sheep and cattle by the hundred, instead of the net cash products from them, considering it foolishness and a waste of time, to keep an account of debt and credit with the farm. There are, however, some exceptions to this rule, as I am happy to say, for I know of men who not only keep proper accounts, but a diary of the day's transactions, and a note of the weather, which is a book of valuable reference.

The Frenchman's receipt for cooking a hare, is to first get your hare; so after securing the fine herd, either for beef or for the dairy, to neglect them would be very poor policy. But I fear that good herds of cattle and cows properly kept and cared for in this section of the country is the exception, and not the rule; and, in making this remark I would not find fault with any man's science or practice; but comparing your own with the best you know of in others, does it satisfy you? If not then seek to improve your practice. By care and painstaking the different breeds of cattle have been brought to their high state of perfection, until now we can send to England better Durham stock than we had from there in 1817, when the first bull was imported into Massachusetts. We have just as good Ayrshires as were ever brought from Scotland, or Jerseys as ever came from that little island, where they were bred and cared for by special enactments, to preserve a distinct race. All of this has been the practical results of a few scientific farmers and dairymen, who had a love for their calling; and much can be learned from these successful farmers and dairymen to the benefit of all the rest. I have said that breed and feed were the two important considerations to success; and feed here is intended to embrace the whole of the care and keep of the animal. It is just as necessary to have good pastures and good water as it is to have good shelter for our stock. The fine gilt-edged butter that we hear so much said about, produced in some of those private dairies near Philadelphia, is the result of good cows, good sweet mixed grasses in the pasture, good pure water, good fine hay, cut before it is mature,

an even temperature in the milk room, and the utmost cleanliness and care for everything in and about the dairy. Is it surprising then that some of those fastidious epicures should pay one dollar per pound for such butter?

It has been demonstrated that we can produce just as good cheese in Wisconsin as is made in New York or Ohio, and butter which is nearly or quite up to their standard, and only for the jealousy on the part of their dealers and a mistaken prejudice in the minds of some, ours would to-day bring just as good prices. I could mention some of the tricks of the trade, so called facts, which have come under my observation in this direction, were it necessary to the subject under consideration. Suffice it to say that with the influence of prominent dairymen, and the co-operation of boards of trade, their prejudice is being removed, and the products of our dairies are being sold on their merits as they should be. But more can yet be done on the part of the dairymen towards a standard of higher perfection by better care and better pasture, for no cheese maker or butter maker, however skilled in his profession, can make good butter or good cheese from impure or tainted milk, either from bad feed, stagnant and impure water, or bad order in the pasture or about the cheese or dairy house.

It is true that some localities are more favorable than others for dairy purposes, but most any pasture can be improved by sowing a variety of grasses in place of one or two; for it is a great mistake to suppose a clover pasture, and only clover, is the best for the dairy cow; it may do well for the pigs to be head and ears in clover, but not the cows. Clover hay cut at the proper time may do; butter made from clover pasture is the poorest of any in long keeping qualities. It is another mistake for the farmer, and especially the dairy farmer, to cut his hay of any kind after the seed begins to mature, for it is the nature of plant life to produce seed of its kind, and when the seed is fully ripe, the plant or stock has done its office work, and begins to decay, and undergoes another chemical change. I know that it is said by some that it will go further, as cattle will not eat so much of it; and so a pile of brush fed to a cow will last longer than hay, but which will produce the most flesh or the most milk? We are too apt to think that most anything will do for winter feed, provided the cows will eat it, and if we can only get them through with strength enough to walk without leaning against the fence, it is all right.

A writer in a late number of Moore's *Rural New Yorker*, asks the question: "What shall we do with our straw?" And he proceeds to answer it in this wise: My working oxen must be kept in good condition for labor; my steers must keep laying on fat and flesh for the butcher, and my spring calves and yearlings must be kept in the best condition to promote and increase bone, muscle, and tissue. It will be a great loss to feed it to my milch cows or sheep; the horses may eat some of it, a part can be used for bedding and thus converted into manure, while the balance can be sold to the paper maker at a good price, and the product exchanged for more progressed fertilizers for my farm." And I ask is there not plain common sense in his answer to the question, and can a Wisconsin farmer do better than to follow his example? More depends upon the feed of our young heifers to fit them for profit in the dairy than many of us are aware of, and it is for the want of this knowledge or this better practice that so many worthless cows are kept on our farms. If science and practical experience point out a different mode, it is our duty as intelligent men to follow it.

Scientists for a long time have known many things about the properties of milk, which dairymen have not known nor would have known, had not the peculiar circumstances which surround them called it out. If the same methods of guess work were pursued now in the manufacture of cheese that were in vogue in our mother's or grandmother's day, this article of food would be a rare luxury. Even at the commencement of the present factory system the notions that dairymen entertained of the properties of milk were very vague and indistinct; and one of their *notions* was that portions of the state of New York and Ohio would be for all time the only dairy region of the United States, and so much was this theory promulgated, that even now large portions of Wisconsin cheese go to New York markets without any factory brand on the boxes, and the receivers brand it to suit the whim of the purchaser. That their opinions as to the resources of the west were unfounded, may be shown from the fact that for the year ending June 30, 1875, there were shipped and exported from the United States 90,611,057 pounds of cheese, and from Canada 23,183,223 pounds, making in all 113,794,280 pounds, and a considerable portion included in the Canada exports came from Wisconsin.

I have taken more of your time with these detailed statements of

dairy matters than I otherwise should, but for the fact that it is becoming more and more every year a branch of industry that the Wisconsin farmer must turn his attention to. We possibly may not compete with southern Illinois and Indiana in raising beef, but we can compete with any part of the United States in producing fine butter and cheese. If our pastures are not quite as good as some in the Mohawk Valley, they can be improved, and we can supplement the feed in times of drought, by planting sweet corn for our herds. Our cows and their feed cost us less than theirs, and thanks to kind nature in this locality for a bountiful supply of pure water which, if it does not run by every man's door, by the inventive genius of man, with the wind mill, we can have it at small cost at every desirable place on the farm.

To science then the farmers are indebted more than many at first are willing to admit. The student of nature, in his love for knowledge, even in the unexplored regions of space, is every day making himself more and more acquainted with the forces of nature which control the currents of winds and storms, and if the elements cannot all be made to obey his will, he so far understands them, that we are enabled to shape our course and our wills to be in harmony with nature's laws. The system of meteorological records, embracing storm signals and weather probabilities has saved hundreds of lives and millions of treasure.

To the skill of the scientist and inventor we are indebted for the implements of every day use in the household, in the factory and on the farm. Since the days of the old fashioned flail and wooden mouldboards, what a gulf between. Intelligent farming is now dignified labor. Mind must be the emancipator, and the farmer who reads, studies and thinks, and applies his thought to work, to him nature will open up her storehouse of treasure.

AGRICULTURAL EDUCATION.

BY G. E. MORROW,

[Professor of Agriculture, Illinois Industrial University.]

In complying with the request of the faculty, that, at the commencement of my work in the university, I should thus publicly

say some words concerning agricultural education, and especially concerning the college of agriculture and its work, I bear in mind that to perform is better than to promise; to quietly and faithfully do one's work is vastly more important than the speaking of any words about what that work is to be; and that we have the best of authority for the statement, that if any one is justified in boasting, it is he who has finished his task, rather than he who is just beginning.

It is not only proper, but it is a pleasure, for me to express my appreciation of the kindly words of welcome which have just been spoken, and my equally grateful appreciation for the less formal greeting I have received from the faculty, students and trustees, so far as I have met them. I have found not only kindly rendered personal courtesies, but also the indications of an honest and earnest desire that the college of agriculture should be made useful and prosperous in the largest practical degree, and a willingness to give it every needed aid in its efforts to grow toward that position.

Something of the history of the movements to secure a wider and better education for the industrial classes, and more especially for those engaged in agriculture, has been given you this evening. These efforts finally secured the magnificent grant of public lands by the general government, which caused the establishment of this among so many other similar institutions, and which caused also the liberal grants by this and other states, by this and other counties and towns, which have made possible the utilization of the original land grant.

There has been much of earnest and not a little of angry discussion concerning these institutions, their proper work and limitations. Many extravagant things have been said; a multitude of crude plans have been made public, and some extraordinary expectations have been held. There has been disappointment to many, and often most to those who have been enthusiastic, if not reasonable in their hopes and expectations. Mistakes have been made by those to whom was committed their management. Confessedly difficult as their work has been, this was inevitable even if the wisest and best of men had always been chosen to plan and execute.

Even if nothing of good had been accomplished as yet, it would not be wise to abandon the effort. Back of, and in large part caus-

ing any wide spread public interest, such as has been seen in connection with this industrial education movement, there is ever to be a real need and the possibility of supplying that need, but these institutions have not been failures. They have done good work; are now doing more than ever before; and it is not an unreasoning faith which looks with confidence to their steady growth into a more and more full accomplishment of their work.

What that work is, is a question of interpretation of the laws under which these institutions were founded. It is not a question of what might have been or of what ought to have been enacted, but of what was provided for by the law, and of what ought to be done under these provisions. The act of congress by which 480,000 acres of public lands were granted to this state, provided that the leading object of the institution established under this endowment, should be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as related to agriculture and the mechanical arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.

The words of the law under which the University was organized show that this institution was designed to be, and must be, a school in which branches of learning are to be taught, and not simply and only a collection of farms and workshops in which the manual labor of the farmer and mechanic is shown and practiced. They show also, and equally clearly, that the teaching is to have a definite object, and that this institution is not to be an exact copy of other and older schools, of which there was no lack. They show also that this is not an agricultural school alone; the mechanic arts are placed by the side of agriculture as its equal.

While there are those who expect too much from these schools, there are many who have no faith in them, so far as their being a help to agriculture is concerned. These men lay great stress on so called practical knowledge. And this is not unnatural. We naturally prefer the lessons learned by our own experience. We remember them, and often practice them. Our own little discoveries seem marvelously great in our eyes. But in farming, as in any calling, all but the simple or the exceedingly egotistical soon learn that life is too short and our intellects too weak for any of us to undertake to work out, unaided, all the problems we meet. We

soon come to be willing not only to observe, but to ask information; not only to use our eyes, but also our ears. We learn that no one man knows as much as all his neighbors. And we ought to be able to see that a fact in agriculture is none the less a fact because it is found on a printed page rather than heard from the lips of a neighbor.

There is no excuse for distrust of teachers of agriculture. Many men, utterly incompetent for the work, have assumed to give instruction. Some of these have been well meaning men, who saw the need for instruction, and were only at fault in supposing that without careful preparation they were competent to give it; but none have been shallow egotists or unprincipled men, they only seeking reputation; the others seeking to advance their own selfish interests. But it is poor reasoning which leads us to reject all teaching because some has proved bad. It should be borne in mind that it is where there is the least knowledge, the impostor and charlatan finds his best field. It is not among the most intelligent farmers that he can best practice on their credulity. The objections to agricultural education are not peculiar. The time has been when it was urged that observation and practice were all that could help in preparing for the practice of any profession. The objections do not show the education valueless; only that the men making them are not prepared to accept its benefits.

It is a most pernicious error that education is any bar to the possession of practical skill. The farmer unlearned in books has no monopoly of practical information about the business.

The great essentials to the improvement of our agriculture are more information and more interest. We need to know more about it and feel more interest in it, that we may make the better use of what we do know. The best security for better practice is more information; the best means of securing greater interest is to impart better and more accurate instruction.

There have been men who have made grand success in life without the aid of education in the schools. All honor to such men, but they see clearly how often their power is limited for want of the things which the schools could have given them. We have all known men literally unable to read who were more successful in money making, perhaps more useful, than a college educated man in the same neighborhood. Yet none of us wish that we could not

read, nor think we advance our children's prospects by denying them the opportunity to learn all they can from books and school. Knowledge, whether gained in school or from experience, does not insure success, but, other things equal, the man who knows most will succeed best. It is the fashion with some to glorify science in its relation to agriculture, and to make absurd predictions of what it can do. It is the fashion with others to sneer at science and pronounce it utterly valueless to agriculture. The truth lies in the middle ground. It is not true that science has done nothing or can do nothing for agriculture. It is not at all probable, on the other hand, that science will ever relieve the work of the farmer from all that is disagreeable or from all uncertainty. There is no conflict between practice and science. Practice must come first, for science is based on facts and experience. It is but the sum of what is known on any subject. It is the knowledge of the many, collected and arranged so that one can make use of it. And no employment of man is more closely connected with science or has need of a greater number than has that of the tiller of the soil.

I can have no sympathy with the foolish and blind opposition to science sometimes seen. On the other hand, I have no sympathy with the contemptuous way in which some professedly scientific men ignore or ridicule all knowledge not gained in the school or the regulation way. All truth is important, but some truths are of more worth than others; some knowledge, of which we can now see no use, may be found of great value. But I conceive the highest use of knowledge or science to be to advance the best interests of man, and I have never risen to that state in which I was utterly indifferent as to the applications of truth. He who discovers any truth, or demonstrates the existence of any law, may properly take pleasure in his achievement; but all the more if he be able to see that the happiness of his fellows will be directly advanced by his discovery. I cannot appreciate the cast of mind which would lead a physician to take equal delight in a discovery that a certain newly discovered and rare drug was a virulent poison, as in the discovery of a certain remedy for yellow fever. Nor can I admire the student of agricultural science who would take equal delight in identifying an exceedingly rare and harmless insect, as in being able to give the world an easy and effective preventive of injury from the western locust.

Some learned men even in our own time have tended to prejudice farmers, as a class, against science by their indifference to its practical applications. I ask pardon if it be not in keeping with the occasion, but by their holding that the only object in the study of science is that we may be the better able to study still more science, some men remind me of the farmer who persisted in cultivating a notoriously worthless variety of potatoes, and in answer to inquiry, admitted the fact of utter lack of practical value, but urged in explanation of his course, that the tubers of no other variety kept so well for seed. And in making practical use of the facts they have gained, some seem as little prepared as the class of boys who stood aghast at an inquiry how much seven bushels of corn would cost at fifty cents a bushel, and explained that all their multiplication had been in apples.

To make a "practical application," I would say that in all his teaching of science, the teacher in a college of agriculture should never lose sight of its adaptations and practical uses; that he should aim, not so much to secure the learning of all possible facts concerning any one branch of natural science, as to seek to impress, so far as he may, the general and more important principles of each on the mind of the student, "so as to promote his liberal and practical education in his pursuit in life." And that in all his teachings he should not forget to inculcate the importance of common sense.

There is a danger, and in our new country, in which most are striving after material things mainly, there is a tendency to narrowness in our views as to what is really needed in education. The apt and true saying, that we should teach the child that which he will be able to make use of in after life, may be given too literal a rendering. The knowledge gained in the schoolroom is not all, and should not be the major part of an education, general or special. At the best this will be but a small part of what is to be known; and it is more important that the mind should have been started aright; that it should have learned how to acquire in the future than it should have learned a few more or less facts.

Some years ago it was said of the English laborer that he was but a living tool; unsurpassed as such, but only this and nothing more. This is not the type we desire for American farmers. We would give them all the mechanical skill possible, but this is not enough. An English plowman may be able to put to shame an

American farmer, but sometimes he is so nearly a living machine, that he will stand powerless to act because of some change in the conditions of his work; whereas the more intelligent, self-reliant American would have been at once able to see and remedy the difficulty. It would be better if the American could equal the other in his manual skill, but if he lack either, better by far that he should have the greater general intelligence. This same typical English plowman would probably be utterly unable to do at all, many things which his American fellow could do as well as he could plow. As before, if either must be lacking, let it be the manual skill. Fortunately, the possession of superior intelligence is no bar to the possession of superior manual skill, and is a help to its acquisition, as it is a help to the gaining of any practical knowledge. The trained eye will see many things which would be passed over by the untrained; the trained mind will also see and understand and make use of many things which the more ignorant would not notice, or see but to idly wonder at. I would give to all students of agriculture practice in the field, but I would never make this the chief end in their instruction. If skill here be all that is desired, there are other and cheaper, as well as equally good schools for the purpose on thousands of farms in the state. Let the parent or the boy decide whether he wish a practical and liberal education in agriculture, or whether he wish to serve an apprenticeship to learn simply the practice of farming, but let him not suppose these are the same or equal things.

It should be borne in mind that constant, severe labor, especially if accompanied with anxiety, tends to unfit one for study; especially for the beginnings of study. Previous study and the knowledge gained by it tends to make labor less irksome and acts as an incentive to further study. If there were no direct gain in money return for his labor, the increased interest he would take in his work would be abundant reason why one purposing to be a farmer should as thoroughly educate himself as practicable in advance of his actual practice. This is true of a child. Long before he ought to be placed at hard labor, he may learn much which will make his work seem less of mere drudgery.

I would, then, have the student of agriculture learn all he can of the soil he tills; have him learn of its chemical and equally of its physical elements. I would have him know, so far as is known, the

reasons for the processes of cultivation he goes through. And so I would have him learn carefully and scientifically of plant and animal life, in health and disease; of the laws of breeding applicable to each. I would have him understand the principles of mechanics, that he may the more wisely select and more skillfully use his implements and machines. And not alone these things which relate to personal work in production—his chief but not his only work as a farmer. I would have him with equal care inform himself of his relations to others; of his rights and privileges and duties as a citizen. I would have him so informed concerning the principles that govern exchange of products, that he should not be a prey to designing men with whom he deals. While this theoretical knowledge should always be accompanied with familiarity with and skill in the manual work of his calling, I would also have it accompanied by as much knowledge of other things as is practicable, that he may have a well developed mind, a sound judgment and the greater ability to enjoy the higher and nobler things of life.

This may not “pay” in all cases so far as the mere accumulation of money is concerned, but even in this, a thorough preparation will bring increased returns in the majority of cases. As our agriculture advances, and it becomes more difficult for those without a capital either of money or of skill and knowledge to succeed as they have succeeded in the past—thanks to the most favorable combination of circumstances which ever surrounded any great people—as all this changes, the money payment for thorough training will be more certain. This change is going on faster than we are apt to think. Within the next quarter of a century there is to be a greater change in our agriculture than in any former equal time, and he is wise who prepares himself to take advantage of this.

The average American young man wishes to do more than simply make money. He wishes to secure influence; to be a leader and a power in his community. No brighter prospect lies before any young man so far as this is concerned that which presents itself to him who with well disciplined mind, and well trained, goes out to be a practical farmer. It is not true there is any such prejudice against the farmer as such, as makes it either impossible or unusually difficult for him to secure respect, influence or position in society, church or state.

The farmer who proves himself fitted to lead and deserving of respect will secure leadership and honor, and will have done good by displacing at least one of the many unworthy men who seek prominence among the farmers, for the advancement of their own selfish ends. It is well to take the time required. The world has been cared for all these centuries, and it can do without us until we have gotten fully equipped for our work. I would be glad to see a large number of the graduates of this institution, as in the past, go out from it to direct farm work, and would not feel that there was any danger of their not finding a full field for all their knowledge.

Not only does an education, such as it is the design of this college to give, fit one to better do the work of the actual, working farmer, and make it more probable that he shall reap a full reward for that work, but it will also fit him, in whole or in part, for other pursuits closely connected with agriculture; callings useful, honorable and giving promise of good rewards to at least a chosen few. Of these may be named, first, that of the teacher of agriculture. State and other agricultural colleges and schools, of which we are to have more, ought to be able to look to the graduates of such an institution as this for the men best fitted to give the instruction they desire for their students. And so of the agricultural press, the agency by which the largest number of farmers can most readily and effectively be reached. It ought to be able to look to this and similar institutions for the men to fill the vacancies in the ranks of its editors. Few fields present a brighter prospect for usefulness and influence than does this. In veterinary surgery is a field with grand opportunities for a young man of education, of talent, of character, who will join the few now at work in elevating a noble calling from the disrepute into which ignorance and dishonesty have brought it. With growing taste and appreciation of the beautiful is found increasing opportunity for landscape gardeners, if so qualified as to deserve the name. Of the same general class may be named the agricultural engineer, and manager of estates. We may look for more partnerships between money on the one hand and scientific and practical knowledge of farming on the other, than we have seen in the past.

And even for the merchant, the lawyer, the physician or the minister who is to do his work in this or other western states, in

which agriculture must long remain the leading pursuit, it cannot be such that knowledge of that pursuit as will enable him to better understand those engaged in it and to fully sympathize with them will not prove of great value. And so, while I wish to see many practical farmers graduate from this college, I shall not count it a misfortune if some turn aside into these or other honest callings.

While to teach what is known as the leading work of the college, it should also do what it can to increase our knowledge, and so it will be my endeavor to advance the care of agriculture by the careful trial of experiments in breeding and feeding, in plant culture, in treatment of the soil, and management and application of fertilizers.

The College of Agriculture of this University stands ready to give, to any who seeks it, such instruction as will help him in his work as a farmer. It cannot guarantee success to its students, but it can make success more probable. Its facilities are good, although far from perfect. Its teachers will do all they can for their pupils. It has many wants, but the greatest by far is that a greater number of the farmers of the state shall be able to appreciate the value of its instructions for themselves or their sons.

While believing that the fullest preparation is advisable for the farmer as for those fitting for other callings, it is remembered that many cannot, and many more think they cannot, give the time necessary for this. To all such this college holds itself willing and anxious to be of assistance. Whether they can spend but one year or but one term, it will do what it can, although such will work under many disadvantages.

The work is wide enough and important enough to satisfy any ambition. It has its difficulties, but these are not insurmountable. It has been well said that the welfare of the state depends on the intelligence and prosperity of the farmer. Of no nation is this more true than of our own. To advance the intelligence of any class is to help them to higher prosperity, a better morality, and a purer religion. To aid in this work is the aim of this college of agriculture, and shall be my own aim and my own work in it.

BARNs.

BY ROBERT J. WOOD, BARABOO.

[Read at the Sauk County Farmers' Convention, March, 1877.]

"I hate long stories and short ears of corn,
A costly farm house and a shabby barn."

It is now more than thirty-eight years since we (my father's family) came to Wisconsin territory. It could not be otherwise than that we should suffer from the discomforts and rejoice in the freedom of such a strange life to us.

It is among the compensations of nature that while our climate, with its rugged vicissitudes, makes it necessary that much should be done to make ourselves and our animals comfortable, yet this same climate gives the ruggedness, the pluck, the reaching out of energetic impulses, that largely overcome all its disadvantages. We were enabled to gradually sweep away all that class of troubles that men can conquer single-handed. With the blessing resting upon us of what seemed then, and seems yet, upon looking back, an especially smiling Providence, we passed rapidly through the log-house and straw-hovel period into the more permanent framed house and barn condition. That barn was not a good one, though of almost the exact dimensions of what I shall give to-day as the minimum size for a model farm barn for general uses. A mistake was made in putting the driving floor through lengthwise. That arrangement will greatly cripple the usefulness of any farmer's barn, of common size, especially in horse-fork usage.

As farmers, we have the dilemma presented to us of short summers for production and long winters for consumption, and we must take a determined hold of both horns or we go under. The farmer who builds a good barn renders this dilemma powerless to such an extent that it may be called, so far as he is concerned, "an improved Short-horn," for he practically lengthens the summer by saving all of, and perfectly, the summer's production, and shortens the winter by economizing the heat that exposed animals are robbed of, and has remaining, over and above the gain in milk and meat,

the satisfaction of knowing, on cold and windy nights, that no animal on his premises is suffering.

Many men have well digested ideas about barn building, but there may be some who have not completed their plans and would be glad to receive suggestions from others. What we all want is a strong barn with the least amount of framed timber, with no timbers in the way, and of such dimensions that animals can be well accommodated and conveniently fed, with the greatest possible amount of storage.

Some rather absurd claims have of late been put forth for the octagon barn. When any of my neighbors show signs of octo-development it will be time enough for me to exhibit such remedies as I can; but as a precautionary measure, I will say something in defense of the gabled-roof of the rectangular barn. This roof space, even to the very peak and from end to end, is as precious as any space within the barn, for here runs the horse-fork carrier from one end of the barn to the other, depositing its load at any point desired, even to the very peak, making it convenient to remove hay from one bay to another, or to take it from any bay and throw it out of doors at the gable end, or to take it in at the gable end to fill up the main floor, when thought best to do so. The horse-fork makes even the beams that cross the bays of very long barns an element of usefulness in dividing different kinds of hay, or hay from bundles, instead of their being in the way, as they are, to a serious extent, in using the hand-fork.

For a hundred years the standard barn has been 30 by 40 feet, with driving floor in the center, stock on one side and a bay or stock on the other. If we have no basement story, we can scarcely improve on this, so far as the general plan is concerned. We can make our posts 24 feet high, instead of 14 or 16 — this latter, or possibly 18 feet, being the highest stretch of the enterprise of the fathers. We can now fill our high barn with but a tithe of the labor and in much less time than our fathers required to fill their low one. So we will settle the height of posts at 24 feet, remembering that the extra cubical contents of the high barn is not our only gain. The increased pressure brought upon the bottom of the hay greatly increases the capacity of the bay. The length of this standard barn also needs lengthening, as well as the posts. Twelve feet is not wide enough for a barn floor; thirteen and a half feet is

much better, for four reasons; First. Horses can be led past a load of hay which will sometimes fill twelve feet too full. Second. A wagon and buggy, or two wagons can stand on this floor side by side, leaving room to pass comfortably between them. Third. It is a better width for horses to turn in while treading out oats, which, by the way, is very useful exercise in cold weather for the older horses, excellent training for the colts, and meets the hearty approbation of the cattle, who will stand expectantly about the back door each morning, wondering with their large eyes if you are ever to rake off your first flooring. Fourth. I fix on this particular width as it lets fourteen feet plank have a bearing of three inches at each end on the cross sills. On one side of this floor you want horses, with their heads towards the floor, so that you can feed and water them without crowding between them; a granary, and, if the width of the barn will admit, a hay hole for the supply of horses, and a small tool room. The hay, as it comes down the channel prepared for it, should fall on an inclined plane at the back side of the space allotted for its use, so that it can be taken up easily by the fork though the hay hole is full to the roof. This saves the trouble of climbing constantly to the top of the barn to get hay. The space behind the inclined plane is utilized, in the barn plan I shall presently show you, for the convenient storage of the best harnesses, the saddle, etc. By leaning up some stout poles in front of the horses and granary, to keep an open passage way before them, and by also keeping an open passage way for a few feet to reach the cow stables on the other side of the floor, the floor may be filled to the peak of the barn, if you so elect, and all barn chores can still be conveniently done.

Fifteen feet is as little as should be given to a horse and his manger.

On the other side of the floor must be a place for cows, a hay-hole constructed as already described, some bran and feed bins, and room to get at these things even when the main floor is occupied. This will require $17\frac{1}{2}$ feet. So I fix the minimum length of a convenient barn for general use, without basement, at 46 feet.

A basement story adds wonderfully to the usefulness of the barn, and the additional expense for the stone-work is not very great if the barn is to have anyway a thoroughly good underpinning. The labor of squaring, leveling and trench digging is a constant quan-

tity in either case. The same roof covers all. The wagon work for the basement is done on the floor already made above, so that all the room gained can be in constant use. This story should not be buried in the earth, but should be built well above ground, with dirt drawn in to build up a roadway to main doors, and to cover root cellar. If the barn has a basement, there must be two feet added to the forty-six named above to make allowance for the thickness of walls, and to have the same conveniences below that we have just named, without having in our way the support to middle cross sills.

We now have height and length. The width must be more particularly determined by him who builds. Let him remember, however, that it is not wise to cramp every thing down as nearly as possible to simple standing room for his stock. A roomy, airy bedroom is a great promoter of health for animals as well as men. If the width of the barn 46 or 48 feet long was left for me to determine, it would be fixed at 36 feet. The rows of cattle in the basement of such a barn as is now marked out, can run either way, leaving ample room for passages.

Remember that it takes no more main timbers, and no more work to frame them, for a barn 46 or 48 feet long, than for one 36 or 40. The true economy is to place the bents as far apart as will admit of reliability in the plates to hold up the greatest weight of damp snow that can be expected to rest upon them. Braced mortices and the waned corners of beams and girts, on their upper sides next to boarding, should be filled up with mortar, thus breaking up as far as possible the nests and runways of rats and mice.

The great secret in making a wall that will not crack, and in time fall down, is not in having flat and square stones, but in digging deep enough to get the bottom of the wall below frost. If laid deep enough, any stones are good enough for a barn wall, for the mortar itself is more than sufficient for all the strength needed. We often use sandstone that has not half the strength of the mortar that is laid around it after it is a few days old. A cubic foot of mortar six months old will bear a pressure of fifty tons. As an ordinary barn with all the hay, grain, tools and stock that can be conveniently got into it will hardly weigh 200 tons, it follows that we need not put ourselves greatly out of the way to get shapely material for the wall.

Those who cannot readily command sawed pine can get just as good a frame by hewing it in their own woods, if they have any. Very poor indeed must be the timber tract that will not furnish a good barn frame. It is not necessary that sills or plates, or even beams, except the two outside ones, should be in one piece. It is cheaper, especially where timber grows with a rapid tapering towards the top, to make splices — very plain ones for sills — than to hew down the large ends of longer sticks. Many of the timbers need not be straight, notably the beams. They may be quite crooked up and down. Many of the posts may also be crooked. Most parts of the frame may be of any timber that grows large enough; basswood, poplar, elm, are all good enough for beams and plates if not hewed too long before being framed. All the oaks, red elm, and butternut are good for sills and posts. Even posts that do not form the sides of doors may be of basswood or poplar. Sleepers, joists, girts and rafters may be brought from the woods. The groves of slim poplars that we often see, would furnish excellent rafters; oak, basswood, or elm will make good floor boards over horses and cattle; oak or elm will make passable roof boards, if they are kept in good shape till about ready to lay shingles over them. For stable floors oak is too slippery, and the other woods rot easily if kept wet. You need not have *any* stable floor of wood at first. Frame the stable high enough so there will be room for a floor when you want one; but in the mean time lay your wall tight up to the sills all around the stable. This should be done even if floor is laid. Fill in dirt, well pounded down, to top of wall. The iron standard of some worn out plow buried where the stall partitions come will make a fixed point to attach partitions to. Now the horses cannot paw through the floor, and a day's forgetfulness in the matter of relaying weak spots in the floor will not result in the ruin of a horse. Rats can have no harbor under the floor, and streaks of cold wind cannot pierce the horses from beneath. When you become dissatisfied with the dirt floor, you can put in a plank one at your leisure, and not a foot of lumber will be wasted in the experiment. The dirt floor is just as available for cows as for horses. Timbers buried their size in the dirt to form a gutter, and so framed that they cannot be pressed together, is all that is needed. Especially is this plan feasible where stanchions are used.

Of stanchions, it may be said that they are the cheapest to con-

struct, the most economical of space, and the cleanest for those who milk, of any plan yet devised, and they do not, in my opinion, when properly constructed, subject the cows to any discomfort. Three feet from center to center has been found sufficient for average sized cows. A four by four scantling makes a good bed piece for the stanchions to work in, and is not too high for the cows' necks to cross when lying down. The space for a cow's neck should be seven inches wide and four feet in vertical height. If the vertical height is much more than this, the leaning half of the stanchion does not get enough out of the cow's way in putting her head in and out. Two by four pieces, free of large knots, corners smooth and rounded next to the neck, make good stanchions. Fourteen feet plank cut in three, or four feet eight inches, is the right average length for floor for grown cows. Mangers should be three feet wide at the top, one foot and eight inches at the bottom, and three feet high. The ditch should drop five or six inches, and have a descent towards some point at which the liquids can escape.

We will go back now to the frame work. The beams ought to be at least eight by ten, laid the ten inch way horizontally, so as the better to resist the inside pressure, which is quite severe when the barn is full of well tramped hay. It should be twenty feet from bottom of sill to middle of beam. If the barn is to be enclosed with dressed boards and battens, the beam should have its under outside corner rabbeted out one and three-fourths by two and one-half inches, and should be framed so as to project one and three-fourths inches beyond the posts. The plates should project at each end of the barn about three feet, or far enough to make cornice by raising a pair of rafters on their extreme ends. If not thought best to project the plates for cornices, they must project one and three-fourths inches, so that the outside of end rafters will be plumb over the outer face of the beam. The first course of boards, twenty feet long, reach from sill to beam, and are nailed at the top end in the rabbet. The battens are now put on, and these, with the boards, just fill out the rabbeted corner of the beam. The course of boards and battens that are to reach from beam to roof, are lapped about three inches over the tops of this first course, and as the rafters are out one and three-fourths inches, as well as that part of the beam to which this last course of boarding is nailed, it follows that the boards are plumb, and shed perfectly all driving rains, allowing no lodgment:

for water, as does the rib that is sometimes used for two lengths of boarding to butt against.

To board up the *sides* of the barn, a set of girts about six to eight, laid the eight inch way horizontally, are framed with their centers sixteen feet above the bottom of the sill, and are rabbeted out the same as just described for the beam. All the girts and braces above these, and the plates also, are set out one and three-fourths inches, so that the top course of boarding, which will be eight feet long, stands plumb. The carpenter must now remember that his plates, from out to out, are three and one-half inches wider than the building, and must frame accordingly for rafters.

The argument against using a rib between two lengths of boarding, applies with much greater force to the use of a water table for the bottom coarse of boarding to stand upon.

The cheapest possible finish for projection of roof is that in which the roof boards, rafters and projecting ends of plates are made useful as cornice. The roof boards, so far as they project over the building at sides and ends, are dressed on their under sides. Projecting ends of rafters and plates are also dressed. A fascia nailed to the end of rafters at the eaves, and to the outside of rafters raised or projecting ends of plates, is all that is required for our plain barn. A gabled hood over the large doors would be a cheap luxury, keeping the entrance dry, protecting the sill at that point from occasional wettings, and breaking the monotony of the broad side of the barn.

The rafters can stand on the plate in such a position that the roof boards do not close down to the corner of the plate, but leave a space of, say two and one-half inches. By not letting the boards on the side of the barn reach above the top corner of the plate, we have this space twice the length of the barn, and perfectly sheltered for ventilation.

Mention has been made, incidentally, of the horse fork. It is too late now to build barns with reference to hand pitching. You can just as well afford to rake up your hay by hand as to pitch it by hand, and better, for raking hay is pleasant employment, while pitching it over the high beam on a hot day — but I will spare you the painful recollection. There are many horse-fork carriers in market, and you can have a wide choice. I have invented one. Some of you have seen it. It is not patented. You are welcome

to make one like mine if you wish to, but I want to make a claim in your hearing, of the invention of the horse-fork carrier as used in the summer of 1876 in the barns of H. H. Potter, N. W. Morley and Fred. Barringer, and as shown on our fair ground last fall. The wagon jack, and the looped chain to drag weeds into the furrow before the plow, as used when I was a boy, have been patented in late years, and I want to head off, as far as I can, such swindlers.

A few experiences — allow me to take that back — a few observations on the discomforts of farming *with* a barn, will make a fitting close for my paper. 1st. Doors flying in the wind, hinges broken, door split, wind and snow driving in, chilling the stock. Remedy: have all the doors fastened when opened as well as when shut. 2d. Sills rotting, floors settling away, wind and snow as before. Remedy: keep the top of the manure pile lower than the bottom of the sill. 3d. Barn floor full of stock as soon as a door is left open for a moment, cattle, sheep, hogs and horses in one muddle, to be charged upon at the point of the bayonet (the pitchfork), and driven out. Sheep are run over and bruised by cows; a hog darts under the corn sheller, carries it over, demoralizing the cast crank; the colt, having torn open a full grain bag, starts out with an empty one in his teeth. The bag must be recovered; by that time the “critters” are all back but the colt. Another bulldozing performance is gone through with, this time in anger. Remedy: have one side of the barn for your own use, to which animals can only come upon your special invitation, for in this way only can you enjoy the building and your work within it as you ought.

FARMERS' BOYS AND GIRLS.

BY MRS. D. HUNTLEY, APPLETON.

Read before the Wisconsin Dairymen's Association, at Appleton, Jan. 18, 1877.

There is nothing in which the farmer should take a greater interest than he does in his boys and girls, and this interest should include all that pertains to their physical, intellectual and moral development, and should be continued and constant during all the

years from infancy to maturity. It is not enough that food, clothing and shelter are provided for the little ones; they also need a loving sympathy with their wants, a kind attention to their forming tastes, and the stern hand of justice to lead the growing mind up to a useful manhood. But too many parents, when they have provided all things for the physical wants, turn to the arduous labors of the field and the farm house, thinking the children will be all right; they are too small to be sent to school, too small to be of any use on the farm, but when they are a little older they will come along into the work and be some help; thus the years slip away, and the boys and girls have formed tastes and habits which neither precept nor example will be likely to change. "The twig is bent, the tree is inclined," and the parents find, when too late, that their children are not what they wish them to be.

It was said of one farmer, that as soon as his little babe could run about the fields, his father, in a playful way, would ask his advice about the farm work; in spring he would say: "Well, Neddie, what do you think about sowing wheat to-morrow? Shall we plant the garden next week and then get in the corn?" And later in the season he would ask Neddie if it was not about time to commence haying, and so on all through the year. In this way the boy became interested, he soon wished not only to talk about the work, but to help do it, and now that boy, at sixteen, can neither be coaxed nor driven from the farm, and it has been observed that he accomplishes more work than many farmers in middle life. Another very successful farmer, so far as his crops were concerned, but thinking more of the hard work than of its benefits, was often heard to say: "I do not wish my boys to become farmers, they must have some easier way to get a living;" and acting accordingly, his boys were early sent to the town, and to-day one is a banker in an eastern city, the other a merchant.

Whatever truth there may be in the oft repeated assertion, that our young men are deserting the farm, that the girls hate farming, is due mainly to some mistake in the early education; not that all the children of farmers can be drilled like so many soldiers, to fall into the ranks, and make farming their business; this is in no way desirable; the point to be gained with these children of the farm is, so to conduct their home life that they will not become disgusted with the labors, the responsibilities, the isolation from society, or

any of the various conditions to which farmers are subjected; not only this, it should be so conducted that the boys, and the girls as well, may lose none of the benefits arising from country life. It may be a difficult matter to do this, but the parents who have these two objects constantly in view, with whom the fixed and determined purpose is new every morning and fresh every evening, that their children shall be respectful, obedient, industrious and useful, will rarely find those children speaking contemptuously of their home life. If there is discontent in the home, we need not go very far to find the cause, and with vigilance enough, we need not go but little farther to find the remedy. There are two reasons why there is so much dissatisfaction among the farmers' children. The boys will tell you they cannot make money fast enough, while the girls will tell you they cannot have the money they have earned to purchase books, music, fine apparel, or to make their rooms attractive and pleasant as those of their city friends; if they could do these things, they would be delighted with their rural home. This is the class of boys and girls who see in farming more advantages than in any other calling, and who should not be discouraged with the never ceasing cry of hard times, poor crops, low prices and hard work. It would be well for those boys and girls now in the outset of life, to remember that it requires neither forethought nor labor, nor energy, to make hard times anywhere; simply sit down at your ease, or go listlessly about, waiting for some new opening, and you will have hard times without further effort; you can make drudgery out of any employment, and then you will have hard work and no time in which to perform it.

Whatever industry of the farm you may select for your special work, you will find use for all your faculties, both natural and acquired. If you turn your attention to wheat growing, stock raising, fruit, or the wool interest, mixed husbandry, or last, though not least, the dairy, you will need eternal vigilance to bring you success. It is your privilege to select that branch of farming which will pay the best, with the least capital, and which will turn your labor into money in the shortest time. There is nothing which small farmers can engage in that will do this so well and so surely as the dairy. If only a few cows can be kept, these will pay until more will grow up to add to your income. In this way the farmers of the old Green Mountain State have brought their wealth from the rocky hillsides and sunny intervalles of their farms.

There, twenty-five years ago, those eastern farmers sold their cheese for four, six, and eight cents a pound, seldom at the last named price; if their butter brought them thirteen or fourteen cents a pound, they were quite satisfied, and if by special contract with some hotel in a distant city, they could get sixteen cents — no families thought of paying that — they would furnish butter the year round at that price. These same farmers bought their calico at sixteen, eighteen and twenty-five cents a yard, and their cotton cloth at a shilling, yet they grew rich; farm was added to farm; sons went to college, daughters were clothed in the finest fabrics the merchants could offer, and to-day these farmers have money at interest for future use. Profiting by their experience, we of the west may do the same. Here in Wisconsin in our own Outagamie county, we have all the conditions of soil, grasses and water, above the average for dairying. In every sunny opening in the partially cleared fields, the white clover, the sweetest food for the dairy cow, comes in unsought, and the fresh green grass comes, "Creeping, creeping everywhere," in all the gardens and cultivated fields. You who have attempted to grow a small strawberry bed understand this perfectly. Why not utilize this almost spontaneous growth, and turn it into a remedy for the hard times and privations of which we complain. Here in our own city, we get more than double the price for butter that those eastern farmers did and we buy our calico at five, eight and ten cents a yard. Our farmer in this county has not sold a pound of butter for some years past for less than twenty-eight cents; from that to thirty-five, and it has sometimes been sold for over forty cents. In the iron regions of lake Superior, butter has been sold for seventy-five cents a pound. If we wish for better prices than we can get at home, doubtless a market could be created; with all the different lines of railroad running to the mining regions, the pineries, and the cities and towns, something could be done in shipping butter to other places.

A first-class article, of firm grain, fine flavor, and rich color, will bring the highest price in any market. This kind can be made here as well as elsewhere.

We speak especially of butter, because that is the beginning of dairying. It comes within the reach of the smallest farmers. If it pay but little at a time, it comes steadily from week to week with the coming wants, and enables the family of limited means to do

that very desirable thing, pay for what they buy and run up no bills. As the capacity of the dairy increases, three or four farmers may unite the milk, and make very good domestic cheese. This alone, in rotation, would relieve each family from the constant care of the dairy, and give the wife and daughters two or three weeks at a time of comparative leisure. This method of manufacturing milk in company would soon originate a cheese factory, which removes nearly all the work of the dairy from the farm house, and is found very remunerative wherever skillfully conducted. Just here the question arises, What is the matter that western farmers are not on the high road to wealth? There is but one answer to this question, We go too fast; we should put on the breaks, go slower, keep down our wants, and live within the income. If this is too hard, make the income larger.

Nor is this all. There is no industry of the farm so well adapted to the farmer with growing children as the dairy. The work is not inappropriate for either boys or girls. It is work that must be done thoroughly, neatly and promptly, and the knowledge acquired in doing any work in this manner is applicable in all business relations in after years. But would you have girls do the milking? We would have the girls know how to do all the work of the farm which they can do, as well as their brothers; then if sickness or absence, or any circumstance make it necessary, there is no confusion, no standing still of business, because there are only girls at home; the work moves on; girls become efficient, useful and beloved—not one bit the worse, but better—for the good they have done. When circumstances do not require it, they may turn to more delightful employment; the music of the piano is just as sweet, whether they sit down the milk pail or lay aside the most elaborate embroidery. It is this mysterious thing called circumstance that decides what is properly women's work; and the kind attentions of thoughtful husbands and fathers, and brothers, will control the circumstances. The more pleasant work of the dairy may be made a very lucrative business for women; high wages are paid for this kind of work; the prizes offered compare favorably with some that are given for literary labor; besides, it is no small accomplishment to know how to make excellent butter. Mr. Carpenter, of New York, will tell you it requires more skill to make first class butter than to make a watch. If you would excel

in this art, you may learn to put up the sweetest of tub butter, that will keep the whole year, or you can make the most artistic print butter, put up in dainty rolls, stamped with a rose bud or sheaf of wheat, or marked with your own initials and made in tiny balls, ready for the daintiest silver dishes, and wrapped in whitest muslin, packed in ice and sent to the city market. You and your butter may acquire a national reputation. If this work is done with promptness and efficiency, and you go about it clad in neat calico, with single skirt and ample apron, and waste not time in ornamenting the garments of labor with ruffles and puffs, or in washing and ironing these useless trimmings, you will find some time each day for reading, study or recreation. If you are the faithful, dutiful assistant of your mother in all the complicated labors of the farmhouse, you are fitting yourself to adorn some beautiful home in city or country that is waiting for you, where you will become the true help meet which God designed you to be. You may seek for some position which you think higher than this, or which you think will make you more beautiful or better beloved, and you may waste the best years of your life searching for it, but you will never find it.

“Beautiful hands are those that do
Work that is earnest, and brave, and true,
Moment by moment the long day through.

“Beautiful feet are those that go
On kindly ministries, to and fro,
Down lowliest ways, if God wills it so.”

There is another class of farmers' boys who never will, nor never ought to remain upon the farm; they have not the qualifications requisite for successful farmers; all their tastes lead them to some other pursuit; they will be needed elsewhere; they will do honor to the professions. To these, especially, something must be said. You find yourself to-day on a farm, removed from the delights and pleasures of city life; you wish to see and know of the things of which you have read; you hear of literary societies and lectures, of college classes and college honors, you love books and study, and would like to be in school the whole year, instead of a few months in fall and winter; and perhaps some boy of your acquaintance, not as old as you, has been sent to a distant university to complete his education, while you think you are left upon the farm

with no chance to learn anything or do anything but hard work; you say, "it is nothing but hurry from spring time till harvest, and then the night and morning chores are more than all the rest, and it is no use to try to be anybody and live on a farm." This is a dreary outlook for an aspiring boy; but the half has not been told, and fortunately the other half is the sunny side. These difficulties which seem to you now a barrier to all improvement, if you do but overcome them, will be the very stepping stones to your greatness.

These are the very things which will make you patient, strong and self-reliant, and this lesson of self-reliance you must learn, sooner or later; if you learn it in youth, you may begin life a man, in mind as well as stature; if you learn it later, it is at a fearful cost; if not at all, you will go ashore a wreck.

The things you so much wish for may not be the best for you. It is pleasant to be shielded from care, to be furnished with money, to be watched by friends; but this is as though in your small garden, you should plant the seeds in spring time and water and care for them, and then shade the young plants from the sunshine and protect them from the winds, and keep them in luxuriant growth till the long days of summer, then remove the protection and withhold your care, and then expect to find blossoms and fruit for your reward in the autumn.

You feel that you have no time for improvement in your studies, but you have the same twenty-four hours in each day that is given to every mortal; no one has more than that; if time is used rightly, and the work of one hour or day is not put over till another, there will be a portion of time for reading, study and recreation, even in your farm life. You have the broadest opportunity for physical culture; good health is the very foundation of a useful life; many a young student has found an early grave from exclusive study, and the want of this same manual labor which you now deplore. You may not make as rapid progress in your studies as you wish, but you must remember that the practical knowledge of the labors of life is what you must first learn; that which you find in books is excellent, and a portion of it must go along with the practical till this is attained; then go, if you wish, and drink long and deep from the fountains of knowledge.

The circumstances of your parents will have much control over

the time you can devote to study. If they can send you to college at sixteen or eighteen years of age, it may be well, but see to it that you do not suffer loss by your early departure from the parental roof.

If you must remain in your home and aid in the daily labors of the farm, do not complain; this, for you, is the path of duty, and this difficult and narrow way leads only in one direction and that is always to success. While treading this path, you are building better than you know, even in your young years; you are of some use in the world; you are acquiring the kind of riches that never will take wings. Do not deplore the poverty which keeps you at home; it is the children of the poor, oftener than the children of the millionaire, that become eminent and useful. The road to fame and to honor does not lead through college halls; many a young man has been compelled to give up his studies, his hopes of graduating honors, and turned to manual labor, and in this, which is mistakenly called the "humbler walks of life," has found distinction and wealth.

The scholars and the statesmen that have lived and passed away, during our hundred years, have not been the most useful or the best beloved.

We think, with admiration, of our Jefferson, of John Quincy Adams, of Edward Everett and Charles Sumner, but these and their eloquence will be forgotten, while the good deeds and comprehensive words of our "Martyred President" will live forever in the hearts of his grateful countrymen. If you would be loved and remembered, after you have passed away, it must be by what you have done, not by what others have done for you.

To-day, there sleeps in "Greenwood," with the monument of enduring bronze above his head, one whose boyhood and early manhood were one continual struggle with poverty, privation and rugged labor; in later years, when successful in business, he was the same untiring worker for the good of his fellow men, and now, though "dead on the field of honor," Horace Greeley still lives, and his name will be loved and remembered as long as the sunbeams shall play over his grave.

You cannot hope for better things than this, you cannot have a rougher road than that over which the benefactor of his race has passed, and if your parents, like his, shall decide that just what

they can do for their children without the aid of others is all that is best their children should have done for them, you, like Mr. Greeley, may live to thank your parents for their nice decision. But do not be discouraged; work steadily on; keep ever in view your cherished purpose; when you have passed from boyhood to manhood, begin your lifework; there is time enough then for all the study needed in the professions. If you would be a physician, the labors of the farm have given you that knowledge of hardships, of exposure to heat and cold, sunshine and storm, which will fit you well for that responsible profession. If you would take up the author's pen, you will have the broadest sympathy with the wants and wishes of mankind, you may touch the heart of the humblest worker, for you know whereof you speak. If you would do good to all men, teach the right, and point out to erring mortals "the best path to heaven," nothing will so acquaint you with God's work as your early association with the mysteries of nature; there you have learned the patient waiting for seed time and harvest, which you will need as you sow the seeds of truth in the highways and byways of life. Wherever you may go, whatever calling you may choose, if you pursue it with industry and integrity, and struggle bravely "to convert obstacle into opportunity," the highest places will be at your command, the best gifts of the people will be bestowed upon you; and may the record of your good deeds become an enduring monument to your memory.

OBJECTS AND WORK FOR THE NATIONAL AGRICULTURAL CONGRESS.

BY PROF. GEORGE E. MORROW,
Of the Illinois Industrial College, Champaign, Ill.

Read before the National Agricultural Congress at Philadelphia, 1876.

The name of this association — the National Agricultural Congress — suggests clearly two things as to its nature. First, it is a national organization; not for the few, not for those of a section, not for any private or personal schemes; but designed, so far as it is possible, to have its influence extend over all the land. Next, it

is an agricultural association; its object is not, primarily, to advance religion, to discuss politics, to engage in works of charity; not any of these things; but, to quote from its constitution, "Its object shall be the collection and dissemination of information in relation to agriculture in the several states and territories, and concerning the climatic, economical and other conditions affecting its progress and prosperity."

It may also be said that in its relations to other associations for the promotion of agriculture, this congress is designed to be friendly and co-operative, rather than a rival or critic; and again, I hope it may truthfully be said, this is a modest and not an assuming or arrogant body. It is not claimed to be the only or the greatest instrumentality for accomplishing the end for which it labors; rather it is content to do what it can for the good of the agriculture of the country, rejoicing in any and every like work, by whatever means it may be accomplished.

With the limitations and qualifications, there still remains a marvelously wide field. We have all American agriculture, and not any one specialty; in whatever relates to the cotton of the south, the grain of the west, the dairy, the cattle on the plains of Texas or the hills of New England; in whatever concerns the producer of any agricultural product in his work, he may properly ask the interest and aid of this association. It may properly discuss the questions relating directly to production, tillage, varieties of seeds and animals, fertilization, etc.; it may and should go further than this, and consider those things which affect the distribution of agricultural products—the great question of transportation, with its important and complicated effects on the agriculture of the different sections of the country, the home and foreign markets, tariffs; these and like topics appropriately may engage the thought and discussion of the members of the congress. And so the important and as yet but imperfectly appreciated subject of agricultural statistics—how to secure their more prompt, accurate and thorough collection and dissemination—is directly within the letter and spirit of the object for which the association was formed. The vital question of agricultural education, and the equally important question of the education of the agriculturists; the relations of a host of sciences to agriculture, and the means of best applying their teachings; all these and other topics of stupendous import-

ance present themselves to the congress. And lastly, it may properly consider questions of legislation, as these affect agriculture; not in any partisan spirit; not to seek any legislation in the special interest of agriculturists as a class — for as the farmers should oppose legislation in the special interest of any other class, they should equally oppose that which is offered as advancing their own special interests rather than for the good of all classes — but to consider and present the opinion of farmers on many questions in which they are vitally interested.

For the improvement of agriculture in its relations to the individual and to the class, we need two things — more information and more interest. To know more about it and to take more interest in it, that we may the better make use of the knowledge we have and that we may acquire. In the effort to gain information, the congress should consider all the topics named in a broad, national way. We should remember that the steam car and the telegraph, that improved means of communication and transportation, have largely abolished the isolation of farmers. It is no longer true that those of any one section can feel themselves independent of or uninterested in the condition of those of other sections. It is a serious misfortune that there should be, on the part of so many connected with agriculture, so strong a tendency to narrow-mindedness. The congress should seek to know both the actual and relative importance of subjects brought before it. Its sessions should be no place for the riding of the hobbies of narrow-minded men, to whom all the world seems to revolve around their little plans, interests or localities. It should seek to learn all that can be learned of the resources of all sections. The study of our agriculture by states or sections, as has been the custom in the past, is unsatisfactory, tending to produce this narrow-mindedness and imperfect conception of important and wide-reaching questions. The congress may furnish a common meeting ground for the actual farmer, for the editor, the teacher, the scientist, the leader of societies connected with agriculture, and I hope it may be ever said of it, that it is willing and anxious to hear the other side of all questions; that its members are not so much advocates as they are seekers after the truth.

In the development of increased interest in agriculture, for which there is surely much need, the members of this association may do

much, by showing that they are themselves interested; that men of education and position think agriculture worthy to be thought about and talked about, and not be regarded as simply a disagreeable means of securing a livelihood.

I name three methods of work for the congress. First, and in some sense chief, by popular meetings, usually held once a year. There is power and influence in the sayings and doings of representative bodies of men assembled together "with one accord in one place." These meetings may discuss general topics, or, on occasion, special topics on which it is desirable to collect information or to stimulate and express public opinion. Second, by publishing its transactions, it will not be necessary to infringe on the province of national or state associations, but by presenting in a cheap yet permanent form the addresses and other actions of the annual meetings, a good which it is difficult to fully estimate, may be done in a series of years. As an illustration, I need only refer to the addresses at the present meeting. It is not mere boasting to say that in no other way can an equally good knowledge of the history, progress and present position of our agriculture as a whole, and especially in some of its great specialties, be so readily and conveniently obtained as by a careful reading of what has been spoken during this meeting. Third, I name special investigations by commissions or individual members. This branch would not be prominent in the near future perhaps, but it might ultimately become important and effective. It is not probable the association would ever find it advisable to assume the management of agricultural exhibitions. In each of the ways named, the congress can exert a healthful and important influence in increasing our store of information, in stimulating interest, and in forming and concentrating public opinion on matters requiring action, legislative or individual.

As most nearly representing my ideal of the future of this congress, I would name some of our national associations of a scientific nature. As in them, so in this, I would have a division into sections for the more careful consideration of a variety of topics for which there might not be time nor opportunity before the general body.

That the work proposed may be done effectively, the congress needs an increased membership. It now relies, and I hope always will rely, for its funds solely on voluntary membership fees. It asks

the aid in this way of all friends of agriculture; and I believe this is the only aid for which it should ask; believing as I do that there is place and room and need for the association; believing as I do that it may have a prosperous and useful career, I look to those interested in agriculture for its support. It seems to me we have now reached a position from which we may ask this support, feeling that the congress is able to give a full return for all it will receive.

The leading obstacles to success, as it seems to me, are three. First, the very magnitude of the work proposed and the wide field sought to be covered. As a rule, our successful associations connected with agriculture have had a special object, devoting themselves to the advancement of a specialty. The American Pomological Society, which has done a great work and won a deservedly high position; the American, Northwestern and various state dairy associations which have been so largely instrumental in the rapid advancement of the dairy interests of America, may be named as cases in point. This is a real difficulty and to prevent the injurious effects of it will require wise and prudent management. The second great obstacle to success is of kindred nature and is found in the vast extent of our country, making it costly in time and money for many who may be interested to attend the meetings of the congress. This may be met in part by having the meetings held in different portions of the country, and is also partly met by the delegates as well as by personal membership which has been provided. By this, the presence of even a single representative may give expression and emphasis to the views of the members of a large society or the mass of farmers in even an entire state. The third obstacle to popularity is one which, if human nature were perfect, need not be named. It is found in the fact that the association makes no direct appeal to purely selfish motives. It does not promise immediate, direct and specified pecuniary advantage to members. It offers no high salaries to induce men to become its leaders. It is not probable that it will try to advance the political aspirations of its members. It offers little in the way of fame to those who work with it. Its hopes and expectations are rather that, quietly, perhaps slowly, it may exert an important influence in advancing and developing the agricultural interests of the whole country, doing most for those regions and those individuals who will most earnestly and effectually work with it.

In the near future, our American agriculture must take a higher position. In no other country has it advanced more rapidly, and in no other has it given greater returns to those engaged in it; but with advancing civilization, increasing population and rapidly growing competition, the mass of farmers must learn to rely more on mind than on muscle; to give more importance to knowledge than to mere physical strength; must grow to rely on themselves and not on legislation, and look for their profits to their farm products and not to increase in the selling price of their land. I look forward with hope to a higher intelligence, more wisely directed industry and a purer integrity among all farmers as the great means by which the difficulties and obstacles in the way of the general prosperity of the class may be overcome. I look forward to the time when the farmers of all sections of the country, knowing each other better, shall respect each other more, and work together more harmoniously and intelligently, and hence, more efficiently advance their common prosperity.

In all this, if it be wisely managed, the National Agricultural Congress may do much. It is young, but it has reached a position of which we have no need to be ashamed. We who are here may make this Centennial year the starting point of a career of vastly increased usefulness for this association which has called us together, and give it an impulse that shall cause it to be still young and vigorous at the second centennial of our country.

THE PROSPECTS OF AMERICAN AGRICULTURE.

BY JOSEPH HARRIS.

Read before the National Agricultural Congress at Philadelphia, 1876.

I have been asked to write a short paper on the prospects of American agriculture. I did not select the subject myself. I am not a prophet or the son of a prophet, and can only judge of the future from the past and the tendencies of the present.

To me, the signs of the times are favorable and the prospects bright. Given a soil in the same condition and with a similar sea-

son, no one, I think, will dispute the assertion that a given amount of time and labor will produce *more* wheat, barley, oats, corn, hay, roots, clover and grass seed; more cotton, rice, hemp, flax and tobacco; and more beef, mutton, wool, pork, milk, butter and cheese to-day than it would twenty-five, fifty or one hundred years ago.

And the same is true, as a rule, of the articles for which a farmer wishes to exchange his surplus products. A given amount of time and labor will produce more and better implements and machines; more woolen, linen and cotton cloth; more boots, shoes, stockings and gloves; more pins, needles, buttons and thread.

The same amount of labor will dig more coal, iron and silver, and will saw and plane more boards, and give us more nails, hammers, glass, putty and paint; will give us more furniture for our houses, and more and better light, and more, if not better, books, papers and pictures. In short, owing to the discoveries of science, to increased skill, and to mechanical and chemical inventions, a given amount of labor will produce more of the necessities and luxuries of life which a farmer needs to procure in exchange for his farm products than it would twenty-five, fifty or one hundred years ago.

So far as material prosperity is concerned, therefore, we are, as a nation, or a community of nations, better off than we were twenty-five, fifty or one hundred years ago. We need not work so hard, or if we work as hard, we can have more of the necessities and luxuries of life. I am speaking now of all classes.

But, of course, it does not necessarily follow that one class in exchanging its products for the products of another class gets, at all times, a fair and just equivalent. And no acts of legislation will make a man just and liberal. If a barber in Kansas refuses to shave a farmer for less than two bushels of corn, the farmer can let his beard grow. And if a shoemaker wants fifty bushels of potatoes for a pair of boots, the farmer *may* have to submit to the exchange. But such a state of things in a free and intelligent community will not last long. The farmer or his son will turn shoemaker, and by and by the shoemaker will want to turn farmer. This matter of the exchange of labor or its products must be left to regulate itself. Monopoly, extortion, and all forms of injustice, seldom prosper in the end.

To me, the prospects of American agriculture were never so bright as at the present time. There is *plenty of work to be done*.

The greatest curse that can befall a man or nation is voluntary or involuntary idleness. "Nothing to do" means poverty and misery. The less a man does the less he is inclined to do. The more he does the more he can do. Idleness leads to weakness and inability. Work gives strength and skill, it banishes despondency and brings in hope, and hope leads to continued effort. If we fail one year, we try again. We get to have faith in the soil and in ourselves. We have to compete with our brother farmers and with the farmers of the world. We feel that farming is no child's play, and we must try to acquit ourselves like men and be strong.

Of our many blessings, therefore, not the least is the fact that we have now, and shall have for years to come, plenty of work to do on our farms.

There are farmers who thought that when their farms were cleared of the forest, and when the barns and fences were built and roads made, there would be little to do. Philosophers also told us, and truly, that trees absorbed carbonic acid from the atmosphere, and that when we cleared up a district we not only removed these natural purifiers of the atmosphere, but when the trees were burnt or decayed, large quantities of carbonic acid were thrown off, and also, that man and beast were daily and hourly polluting the atmosphere in the same way. All the processes and operations of civilized life produced enormous quantities of carbonic acid, and we at the same time were removing the trees which nature had provided to purify the atmosphere. Now all this was true enough, but the great fact was not then known, that an acre of corn would take up probably five times as much carbonic acid as an acre of forest trees, and that wheat, barley, oats, grass and clover, and all our cultivated plants were much more efficient purifiers of the atmosphere than the native forests. The fear that this continent would become a black hole of Calcutta has proved groundless; and so the idea, that when we have done the pioneer work of agriculture there will be little to do, is equally erroneous. The better we farm, the farther we advance; the more improvements we make, the more work will there be to do. Let us be thankful. On my own farm, I have little or no wood to chop in the winter, and yet I find no difficulty in keeping nearly as many men at work in the winter and spring months as during the month of harvest. In fact, wages being much less, I employ more men in the spring than during the summer.

Few farmers, twenty-five or fifty years ago, could have anticipated such a result. The truth is, there is scarcely any limit to the amount of work to be done on the farm. The more we do, the more there is to be done. Work makes work. And as a rule, our profits come not from land but from labor.

When the duties were taken off foreign grain, the English farmers thought their occupation was gone. They thought their occupation was gone. They thought it was impossible for them to compete with the owners of cheap land. They really believed that there was land, so rich, that in the language of Douglas Jerrold, it "needed only to be tickled with a hoe to make it laugh with a harvest." Experience has proved their fears groundless. It will be so in this country. Many of us who reside in the older settled states, think we cannot compete with the cheap, rich lands of the west. And no doubt this competition demands our best thoughts, and will tax our skill and energy. We may have to make many and frequent changes in our rotations and general management. But we need not despair. We shall be able to make a living. There is no paradise on earth. "By the sweat of thy face shalt thou eat bread." There will be found advantages and disadvantages in all sections. More depends on the man than on the situation.

I read a remark a few weeks ago in one of our leading papers, that, owing to the enormous amount of land in this country, it would be 250 years before there was any real necessity for scientific agriculture. The writer evidently attached some technical and definite meaning to the phrase "scientific agriculture." The truth is, however, that what would be scientific farming in England might not be scientific farming in America; what would be scientific farming in New England or New York might not be scientific farming in Kansas or California. He is the scientific farmer who makes the most of his labor and capital. And there is just as much necessity for scientific farming to-day as there will be 250 years hence. And true scientific farming will be just as profitable at the present time as it ever has been in the past or ever will be in the future.

I greatly mistake the signs of the times if, in the near future, we shall not find as many, and as true scientific farmers in America as are to be found anywhere in the world.

Take up an English agricultural paper, and, no matter what sub-

ject is under discussion, you will not read far before allusion is made to the question of "tenant rights." A farmers' club cannot discuss the science and practice of feeding stock without getting excited over the malt-tax. "If we could feed malt," they say, "we could then raise cheaper beef and mutton. If we could get compensation for our unexhausted improvements we could employ our skill and capital to advantage." We are not without our troubles here. We have some burdens that are hard to bear. But, at any rate, we are our own land owners. Any improvements we make are made on our own land. Our land is not entailed. We can transfer it as easily as any other property.

We sometimes grumble because our best farm laborers so soon leave us. They want farms of their own. I have a man who has worked for me twelve years, and who has now, out of his savings, bought a nice farm of his own. I lose a good man, but he will work quite as hard for himself as he did for me, and put more thought, care and skill into his labor. It may be a loss to me, but it is a gain to the country. He will be able to earn more money, and will have more to spend.

American farmers, as a class, work harder than any other farmers in the world. We occasionally find a drone in the hive, but on the whole, we are a nation of workers, and it makes a great difference whether a man is working for himself or for others. We all know what a difference it makes in the amount of work done whether a man is working by the day or by the piece. Last autumn I had men digging potatoes by the day; I paid them \$1.25 per day. Digging, picking up and pitting, cost me over six cents a bushel. I then told two of the men I would give them five cents a bushel to do the work. They took the job, and these two men dug and pitted 100 bushels every day, and then went home; they sometimes got through by four o'clock in the afternoon. I got the work done cheaper, and the men earned double the money. Now just think what this means; these men were earning \$1.25 per day. If we assume that it cost them \$1.00 per day for family expenses, they made 25 cents a day. Now with a little more energy, care and skill, they earned \$2.50 per day, and instead of making 25 cents over and above expenses, they made \$1.50, or six times as much. In other words, they really made as much money in one day as they were previously making in a week.

I mention this merely to illustrate my idea in regard to the great advantage it is to us as a nation to have such a large proportion of those engaged in agricultural pursuits directly interested in the results of their labors. They are the owners and occupiers and workers of the land. Self interest calls out all their energy and skill. They make every stroke tell. A nation of such farmers ought to be a rich nation.

The American agriculture of the future will not be English agriculture, or European, or Chinese agriculture, it will be American agriculture. We shall think for ourselves. One of the oldest and most successful farmers in the state of New York is a Scotchman. But he does not use Scotch plows or adopt the Scotch system of rotation. He uses his Scotch knowledge and experience. But his farming is essentially American. We have many good English farmers among us, but we have no English farming.

We have to think for ourselves; we have to study principles and apply them. Liebig has more readers here than in Germany.

The results of Lawes and Gilbert's experiments at Rothamstead are more carefully studied in this country than in England. And there is a reason for this. The English farmer can apply Lawes superphosphate to his turnip crop without studying Lawes and Gilbert's account of their thirty years' experiments. But here if we would get any benefit from these wonderful investigations, we must study them and master the principles of agricultural science.

This we are to some extent doing. The large circulation of our numerous agricultural papers proves that American farmers are great readers as well as great workers. They do not spend their evenings at the village tavern. Their houses may be isolated, but they are the homes of much that is noble and true. We need have no fears in regard to the rising generation of American farmers.

"But are not your sons leaving the farm?" Certainly, and do not English farmers' sons leave the farm? The sons and daughters of Queen Victoria cannot all be kings and queens, and the sons and daughters of farmers cannot all be farmers and farmers' wives. I do not object to young men leaving the farm for the cities, nor to successful business men turning farmers. We need more of the latter class in the country.

But what of the active, enterprising, well educated young man who sticks to the farm, or who adopts agriculture as the business

of his life; what are his prospects? The farmer's son who leaves the farm and turns carpenter, brick layer or mason, may become a builder and contractor, and the owner of a dozen blocks, the quarterly rent from any one of which would buy his father's or his brother's farm.

Another farmer's son turns blacksmith, and having learned to make nails and horse shoes by hand, thinks he can make them by machinery, and becomes a millionaire. Another is a shoemaker, but does not stick solely to his last. He becomes, after a few years, the president of one of the largest boot and shoe manufacturing companies in the world. Another studies law, and becomes an O'Connor or an Evarts.

But I need not go through the list. We all know, and the young men on the farm know, that there are great prizes to be won in the learned professions and in trade, commerce and manufactures. And they will try for them, and work for them, and I do not object to it, and if I did, it would make no sort of difference. A business in which there are no prizes will have little attraction for a young man full of hope and energy.

Are there any prizes to be won in the field of agriculture, and, if so, how shall we go to work in order to get them?

Farming is said to be a slow business, but sure. The man who cannot work and wait will not succeed. But the agriculture of to-day, or of the future, is very different from the agriculture of the past.

The improvement in agricultural implements and machines is something wonderful. We can hardly realize the advantages which the men of science, inventors and manufacturers, have bestowed on agriculture. Many of the operations of agriculture are dependent on the weather. A large factory making shingles goes on, no matter what the weather may be, but a single shower will stop a whole field of haymakers.

Twenty-five or thirty years ago, a farmer with a hundred acres of hay to cut, and a hundred acres of grain, had to hire extra men for a month or six weeks, paying extra wages, and converting his home into a large boarding house. And he could not cut all his grass and grain just at the right time. But now how is it?

We start a couple of mowing machines in the afternoon; ted the grass the next morning; rake it into windrows; ted it again once

or twice, if need be, in the windrows; put it into good cocks, and it is safe. We can draw it in the next day, or as soon as we can get at it. In my own case this year, though the weather was unusually catching, we were all through haying and harvesting by the last week in July, the grain all thrashed and safe in the barn ready for market.

We have a bad climate for a poor farmer who gets behind-hand with his work. But we have as good a climate as any to be found in the world, if we knew how to take advantage of it.

I thrash my grain in the field by steam. I find that we can get in a field of grain much more expeditiously than if we put it into a stack or barn, simply because the man on the wagon can throw the grain to the machine easier than he can throw it up on a stack or bay. And when we are through we are through; the straw stack built, the grain in the barn, and men and horses ready to fight the weeds during our splendid August and September weather, when even quack grass is not difficult to kill.

This is what machinery has done for us. And it has done much more; but it is not necessary to allude to it. Machinery makes us far less dependent on the weather than formerly, and *better farming* also helps us in the same direction. When I first went to Rothamstead, Mr. Lawes asked me about my father's farm, the character of the soil, the rotation and yield per acre. "It is rather light land," I said, "but yields good crops, *if the season is not too dry.*"

"I suspect," said Mr. Lawes, "that your father is not a very good farmer. There is nothing which a good farmer dreads so much as a wet season."

This was a new idea to me. I have an English foreman, and our climate is a sore trouble to him. From May till November, he is always wanting rain. "The mangles are growing surprisingly," he said, some weeks since, "but another shower of rain would help them."

"Perhaps so," I replied; "but as we cannot get rain when we want it, let us keep the cultivators going and kill the weeds."

For my part, I like our climate. But it makes no sort of difference whether we like it or not. We cannot change it. What we need to do is to study the climate and adapt our crops and our methods of cultivation and manuring to it. One thing may be safely said, that at least three-fourths of our seasons are very bad seasons for bad farmers, but good seasons for good farmers.

Take the barley crops as an illustration. In Western New York 20 bushels per acre, weighing 48 lbs. per bushel, is a good average. It probably will not average more than this the present year. And yet we have had rather an unusually favorable season; so favorable indeed, that the maltsters expect to get barley at a low figure, say 75 cent. per bushel.

Now I feel safe in saying that on well-drained, well-prepared and properly enriched soil, our climate is capable of giving us an average yield of 40 bushels of barley per acre; and I think the average price of six-rowed barley is fully \$1 per bushel.

I have said that 20 bushels is a fair average crop; and this is taking good and bad crops together. There are many crops which yield 30 bushels, and, consequently, there must be many that are not over 10 bushels. But we will take 15 bushels as the average crop of a rather indifferent farmer. He sows two bushels, and will be very apt to leave two bushels on the ground in harvesting the crop, and so, after deducting seeds and scatterings in harvesting, he has 11 bushels to sell, which, at 75 cents is \$8.25 per acre.

The good farmer has 40 bushels. He sows two bushels, and we will reckon that he loses two bushels of scatterings, though a good crop does not scatter half as much as a poor crop. This leaves 36 bushels, which, at 75 cents, is \$27 per acre, or over three times as much as from the poor crop; and this, mark you, is in a *good* season.

Now, how is it in what we call a bad season, that is, in a season unfavorable for the growth of barley on ordinary land?

In such a season, we have hundreds of farmers whose barley crops will not be over 12 bushels per acre. Deducting, as before, 2 bushels for seed and 2 bushels for scatterings, we have 8 bushels of merchantable barley, of rather an inferior quality, weighing, perhaps, 46 lbs. to the bushel.

Owing to the unfavorable season, barley will be likely to bring \$1.50 per bushel. The net returns from such a crop, therefore, will be (8 bushels of 46 lbs.) at \$1.50 per bushel of 48 lbs., \$11.50.

The good farmer, on well-drained, well-prepared, and properly enriched land, will have, say 36 bushels per acre of 48 lbs. per bushel. Deducting 2 bushels for seed and 2 bushels for scatterings we have for sale 32 bushels at \$1.50 per bushel, or \$48 per acre.

In the case of potatoes, the advantage of raising a good crop in an unfavorable season is even still more striking. And since the advent of the Colorado beetle, rich land and better cultivation are absolutely essential, for the reason that it costs no more to kill the "bugs" on a crop that will yield 250 bushels per acre than on a crop that will yield only 100.

I live in a great potato-growing section. One hundred bushels per acre is a fair average crop. Last year (1875) the season was remarkably favorable for the growth of potatoes in nearly all sections of the country, and millions of bushels were sold for less than it had cost to dig and market them. In my neighborhood, I have seen many pits of potatoes that were left in the field to rot. The year before we got \$1 per bushel for potatoes, and it need not surprise any one if they are \$1 per bushel again before next spring. Such a season as this is the good potato grower's opportunity. With potatoes at \$1 a bushel, a good farmer can make money, and make enough to more than compensate for the loss he suffers from low prices in seasons when the average farmer has a fair crop. But I must not dwell on this point. The truth of the matter is this. With our large area, a fair average crop, such as we have in a highly favorable season, means low prices and small profits. A poor general crop means high prices for everything we consume at home, such as beans, potatoes, barley, oats, buckwheat, etc. A poor crop of wheat and corn does not always result in high prices, for the reason that we export largely, and the price is dependent on the price in England and on the cost of transportation. As a rule, we should aim to produce those articles which we import, rather than those which we export. A short crop of barley, beans or potatoes always gives us good prices; but such is not the case with wheat and corn unless the failure is so general and so severe as to entirely stop exportation. When the price of these articles is determined by the price at which they can be delivered in our markets from foreign countries, rather than by what it is worth to export to foreign markets, the American farmer is sure of getting full compensation for his labor. And in this connection let me say that it seems strange that we have so long let the foreign seed-growers supply us with such a large proportion of the vast aggregate amount of field, vegetable and flower seeds which we annually use in this country. Depend upon it, in the near future, we shall grow our own seeds.

As I have said before, the agricultural outlook in America is an inviting and prosperous one. There is plenty of work to be done. We own our own farms; we are surrounded by an active, energetic and intelligent business, commercial and manufacturing people, and our own prosperity will be in proportion to the energy, skill and intelligence we put into our work. We shall not confine ourselves to raising wheat and corn, pork and beef. Many will do this. But others will raise products which require more capital and skill, and afford larger profits.

Our first object must be to make our farms cleaner and richer. Draining when necessary, and thorough cultivation, especially on the heavier soils, are the first steps. The real source of fertilizing matter is the soil. Draining and cultivation render a portion of the plant food, which lies dormant in the soil, available. Mr. Lawes has raised fifteen bushels of wheat *every year* for over thirty years, without manure, the grain and straw being all removed. In other words, on his heavy lands, cultivation renders enough plant food available every year for fifteen bushels of wheat and straw. This is the normal yield of his soil. On lighter and poorer soils, the normal annual supply of plant-food would not be so much, and on richer alluvial soils it is often much greater. But whatever the exact amount, it is evident that this annual supply is the real manurial income of the farm. Our object must be to use this annual income to the best advantage. If we sell all our crops we live up to our income, and the farm gets no richer. And if we lose any by leaching or evaporation, the soil becomes to that extent poorer. If we retain half the crop at home on the farm, and use it judiciously, we add so much to our manurial capital.

Many of our farmers sow land to wheat and seed it down with clover. They then plow under the clover and sow wheat again. In this way they raise a crop of wheat every other year, and, *theoretically*, if the normal yield, or the annual supply of plant-food, is equal to fifteen bushels of wheat per acre, the yield, in such a case, every other year, should be thirty bushels to the acre. You get no more wheat in one case than in the other, and the only advantage is the saving in seed, and in the labor of preparing for and harvesting the crop. I admit that these are very great advantages. Summer fallowing on some soils would have equal advantages. But I have not time to dwell on this part of the subject. I have said that,

theoretically, if the normal yield of a soil is fifteen bushels per acre, if we plow under a year's growth of clover, we ought to get thirty bushels, because we have two years' supply of plant food in the soil. There is a principle, however, which interferes with this result. The soil is very conservative. It is not easy to get out of it all we put into it. A dressing of farm yard manure or a crop of clover plowed under, is not by any means taken up by the growing plants in a single season. In heavy soils especially, decomposition proceeds very slowly, and it may be several years before all the plant food supplied by a crop of clover is given up to the plants. Still the fact remains that when we plow under a year's growth of clover, we have accumulated in the soil an extra quantity of plant food, equal to the annual supply rendered available by the processes of agriculture and the decomposing and disintegrating action of sun and air, heat and cold. And it is this fact that lies at the basis of all judicious rotations of crops. I cannot but feel that we are on the eve of many important discoveries which will enable us to add greatly to the yield of our crops and the profits of our farming.

We have learned how to make a sheep produce as much mutton from one year's feed, as was obtained from three or four years' feed less than a century ago. We shall learn how to get out of our farm-yard manure all, or nearly all, its valuable plant-food in a single year, if we so wish, and consequently be able to raise a much larger crop. We shall have the matter more under control.

We plow under a crop of clover for wheat, and in this way get two years' supply of plant-food for the wheat. We ought to double our crop of wheat. We ought to get as much wheat from the one crop every other year as from two crops of wheat grown successively on the same land. The advantage of the plan, as I have said, is in saving the seed for one crop and the labor of putting in the crop and cutting it.

But I feel sure that growing a crop and plowing it under, merely to enrich another crop, is not always the most economical plan. It is good as far as it goes. It is far better than growing grain crops year after year on the same land.

But there is a better way. There is much nutriment in the clover, and this nutriment can be taken from the clover and still leave nearly all the elements of plant food in the excrements of the ani-

mals that have eaten the clover. And what is true of clover is true of all other food. Bran is sometimes used for manure, and so are malt-roots, and a few years ago some of the Connecticut tobacco growers used corn meal as manure. Now if a sheep only takes out from 5 to 10 per cent. of nitrogen, and a still less proportion of phosphoric acid, potash and other valuable elements of manure from the food, and if these elements are left in a more available condition in the manure than in the food itself, I think we shall be able to make a profit in feeding the clover and other food to sheep, rather than to plow it under merely for manure. I am well aware that when we feed a ton of clover, containing 100 lbs. of nitrogen, to sheep, we do not always get back 90 to 95 lbs. of nitrogen in the manure. A careless farmer might lose half the value of the manure by leaching. But there is no necessity for this. The elements are in the manure when it leaves the animal, and we shall learn how to preserve them, and I feel sure we shall soon learn how to make them more immediately available to our crops. How to get out of our soil more of the large amount of dormant elements of plant-food which it contains, and then when we have got these elements, how best to use them and save them, should be the great aim of scientific and practical agriculturists. I know of no better plan than the one I have suggested:

1st. Draining and thorough cultivation. These operations, by letting in the air and sun, decompose and disintegrate the organic and inorganic elements of plant-food.

2d. To grow such crops that will take up the largest proportion of this plant-food from the soil and subsoil. Clover, on many soils, is one of the best plants for this purpose. Peas and beans, in favorable latitudes, are also good. Grass and oats are less valuable for the purpose, but still useful, and our grand, national cereal, Indian corn, can be used with immense advantage. But we have much to learn in regard to the peculiar requirements and uses of this magnificent crop.

3d. After we have taken up and organized into useful, nutritious food the annual supply of plant-food furnished by the soil, we have to study the best method of extracting this nutriment and turning it into meat, and at the same time save the elements of plant-food in the shape of manure for future crops.

Of course, in a paper of this kind, I cannot go into details. The

crying necessity of the age is more and better meat. The better our education, the more skillful and intelligent our population; the harder we work with our brains, the more animal food we seem to require. Improved animals, like the Short-horns, for instance require richer food than Texan cattle, and bright, active, energetic men, as a rule, require, and will have, more nutritious and more easily digestible food than the slow, plodding farm laborer of the past. In all civilized countries, the demand for animal food is increasing much more rapidly than the supply. England is searching the world over for meat. And, what is still more strange, with all our immense area of cultivated land, New England, New York and Pennsylvania send thousands of miles for beef cattle. This is very well, but we shall soon learn that we must look to improved agriculture, rather than to cheap land and semi-wild animals, for a steady supply of good meat. The farmers of New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota, need have no fears that Texan cattle will crowd out Short-horns and their grades from our markets. We shall produce better meat and we shall get better prices for it. Poor meat is the dearest of all food. Many of our farmers think they cannot afford to produce beef and mutton. And this is probably true, unless they produce beef and mutton of better than average quality. There is an astonishing amount of poor meat raised and sold even in the better farmed portions of the country. We must raise good beef and good mutton. To do this with profit we must furnish richer food, and this will afford richer manure. And taking meat and manure into account we can make a profit.

A few years ago the wool from Leicester, Cotswold and other long-wooled English sheep sold for from 20 to 30 per cent. less than Merino wool. Now all this is changed. Desirable combing wool brings from 20 to 30 per cent. more than Merino. This is a great change. Congress was at one time urged to take off the duty on combing wool because it was said the farmers of the United States could not produce this kind of wool. It could be grown in Canada but not here. On the west side of the Suspension Bridge, over the Niagara river, combing wool could be produced of excellent quality, but not on the east side. And while the Canadian farmers on the east side of the Detroit river could produce the best of combing wool, the farmers of Michigan on the west side of the river

could not do so. And a member of congress, a lawyer from the state of New York, and in many respects a very intelligent and able man, actually asked me in all sincerity and earnestness whether this was not really the fact. I need not say that there is not a particle of truth in the idea. We *can* raise just as good combing wool in the United States as can be raised in Canada. And the only reason why Canada combing wool sells from 15 to 20 per cent. higher than our combing wool is, that the Canadian farmers understand the management of long wooled English sheep better than we do. They raise more roots and feed better. It is not any difference in soil or climate. We can raise just as good combing wool as can be raised in Canada, and we are learning how to do it.

Some time since I read an article in the London Agricultural Gazette, headed "The most profitable flock in Essex, England." Merino sheep were imported into England nearly a century ago when fine wool commanded high prices. But it was found that owing to the demand for mutton, the coarser-wooled sheep were much more profitable. Still the sheep were kept for many years. Finally, however, the attempt to raise fine wool was abandoned, and these Merino sheep were crossed with the English mutton sheep. And it was a flock of these cross-bred English and Merino sheep that was pronounced the most profitable flock in the county of Essex. My own experience in this country is in the same direction. By selecting a flock of common Merino ewes, which average at full maturity 80 pounds each, and which cost me \$2.40 per head, and by putting them to a high bred, pure Cotswold ram, I got a lot of strong, healthy lambs which, with good feed, grew rapidly and afforded excellent mutton, and the wool, even the first cross, sold for combing. A second cross, that is, by taking the ewe lambs from the first cross and putting them, when about eighteen months old, to a pure-bred Cotswold ram, produced lambs which approximated closely to the Cotswold in size and in length of wool, while the lambs are hardier and stronger, and the wool finer, and the mutton of better quality than the pure bred Cotswold. I killed one of these three-fourths Cotswolds-Merino sheep, which, at 15 months old, dressed 25 pounds per quarter.

We have millions of these hardy common Merino ewes, which can be bought at from to \$2 to \$4 per head, and two or three crosses of

Cotswold or Leicester blood will, with good feed, give us not "the most profitable flock in Essex" merely, but, in certain sections, the best and most profitable flocks in the world. The Cotswolds and Leicesters are too fat. The Merinos are too thin. The Cotswold wool is too coarse and unnecessarily long. The Merino wool is very fine but too short. By crossing, we can get just the wool and mutton most in demand. And the sheep are admirably adapted to our climate. Of course we must feed better than we are in the habit of feeding common Merino flocks, but that is precisely what the requirements of our agriculture demand. We shall feed higher and make much richer manure.

Good mutton in England brings a higher price than beef. We are shipping beef quarters to England; we shall ship mutton carcasses also just as soon as the farmers of the United States raise such sheep as I have alluded to. Well-fatted mutton will keep longer and better than beef, and I should think there would be no difficulty in transporting it across the Atlantic. And if I can trust my own taste the mutton of these grade Cotswold-Merino sheep, when well fatted, will be found nearly, or quite equal to South Down mutton, especially when kept till nearly two years old. I have just weighed (Aug. 24) one of my two year-old grade ewes that has been running with the rest of the flock, but which did not have a lamb last spring and is consequently almost fat enough to kill. She has two crosses of Cotswold blood in her, she is perfect in shape, except that her legs are a little too long, but she is a remarkably strong, vigorous sheep, admirably adapted to our climate and mode of farming. She weighed $200\frac{1}{2}$ pounds, and would probably dress 28 pounds to the quarter. I do not wash my own sheep, but I sold some grade lambs to one of my neighbors who washes his sheep. He told me that one of these grade Cotswold-Merino lambs this spring sheared twelve pounds of *washed* wool.

Now if we can raise such sheep, and I am sure we can, and if we can send the surplus mutton to England after we have supplied our own markets, I see no reason why we cannot adopt a higher and better system of farming — why, in other words, we cannot keep more stock, feed higher, and make more and richer manure.

There are only two points to be observed: 1st. We must use *pure-bred, long-wooled* rams, and 2d. We must feed the ewes and lands liberally. We have plenty of corn, and clover is easily raised,

and bran is usually cheap. I hope to live to see the time when we shall send less corn and more mutton across the Atlantic, and when we can raise nearly all our own combing wool.

Hitherto we have raised few turnips or other roots for our sheep. Much has been written and said in their favor and many farmers have tried them, only to give them up. The English farmers, to a great extent, feed their turnips on the land as they grow. In our own severe climate we have to keep them in pits or cellars. We get our seed largely from England and sow the English improved varieties.

Twenty-nine years ago, I was walking with Mr. Lawes in a turnip field at Rothamstead. We came to a part of the field where, up to a certain row on the right hand, the turnips were much better and larger than on the left hand. "What is the reason?" I asked. "Has one part of the field been dressed with superphosphate or manured more heavily than the other part?" "No, both were treated alike, but this fine crop is 'Ikerving's Improved Purple-top Swede,' while the other is a common variety which has been grown for some years in this neighborhood. And I wish," said Mr. Lawes, "you would take a sample from both and analyze them." I did so, and we found the "improvement" consisted principally of water. The English seed growers have for years made great efforts to improve the varieties of turnips and mangels. They have bred for size and shape, and they have attained wonderful success. But the increased size is to a large extent merely an increase of water. They have got varieties so much improved that they can grow eighty-four tons per acre, nearly eighty tons of which is water.

Now, in this country, we do not wish to pull up, top, draw home, pit and slice up eighty tons of water to get four tons of food. We can pump water far cheaper with a wind mill. And turnips and mangels will never be generally grown in this country till we begin to breed for quality rather than for size. When we can get mangel wurzel that contains but little more water than fresh grass or fresh clover, we shall then be able to gather, store away, cut and feed out the crop at one-third the expense, and the roots would keep better. We should then be able to grow them for winter and early spring use as a substitute for grass. But as long as we are caught by size and sound; as long as we select varieties such as "Norbiton Giant," because it grows big and has a big name, we

shall find little profit in root culture. I am in great hopes, now that there is a prospect of having experimental stations as fast as the means and men can be obtained to establish them, that American seed growers will breed for quality rather than for size. It is a comparatively easy matter to "improve" a variety the wrong way; it is easy to take a sugar-beet and breed it back to a mangel wurzel. The reverse process may not be so easy, but it can be done. Our roots seldom grow so large or so watery as the same varieties do in England, and by growing our own seed and selecting bulbs that will give us the largest yield of real food per acre with the least water, we may hope to make some real improvement that will far more than pay the cost of all our experimental stations for the next twenty years. We shall then export mangel wurzel seed to England and France instead of importing it.

And I hope and firmly believe that we shall do the same thing with herds of sheep and swine. There is a grand chance for intelligent, skillful, scientific and honest breeders in this country. But we must breed for real merit and not for show. Our experimental stations must test our work as we proceed, showing us the right direction, and checking us when we are going wrong.

We have, for years, been importing the best cattle and sheep and best swine that England could produce. We have been able to hold our own in the case of pedigreed cattle. But we have not attained like success in the case of English breeds of sheep and pigs. An English-bred sheep or pig almost always makes a better appearance in the show-yard than the home-bred, even though descended directly from the very choicest imported stock. It is worth our while to ask why this is the case. Why cannot we succeed as well with English sheep as with English Short-horns?

I think we may find an answer, at least, in part, in the fact that Short-horns have a recorded pedigree, the sheep and swine have not. The Short-horns are kept as pure in England as they are here. We compete on common ground. But how is it with sheep and swine? If I wish to show a sheep or pig at the Centennial, I am required to furnish evidence that it is "imported or descended from imported animals, and that the home-bred shall be of pure blood as far back as the fifth generation."

No real American breeder will object to this rule. With my own sheep and swine, I can comply with the conditions, but in reply

to a request for suggestions, I remarked that the same rule ought to be applied to English breeders and to imported stock as to American breeders and home-bred animals. If not, why not?

I have got Cotswold sheep imported from the best breeders in England, but I have never yet happened to see a pedigree of English sheep or English pigs that was worth the paper on which it was written. I do not say that English sheep and pigs are not pure, but I do say that, as a rule, the records do not prove it. And I think that far greater latitude is allowed the English breeders of sheep and swine than is allowed to American breeders. When we get imported animals, we put numbers in their ears and keep the stock pure. No reputable breeder resorts to crosses. And we can furnish longer pedigrees of Cotswold sheep, Essex, Berkshire and Suffolk pigs in this country than are usually furnished by English breeders.

I saw, sometime since, the pedigree of an imported Essex boar. The dam took this and that prize — the sire was never beaten at any show, and so of the grand-dam, and the grand-sire was the celebrated boar something-or-other, “the progenitor of the race.”

Talk of short pedigrees! Why, it has been claimed, and perhaps justly, that Chester White and Poland China pigs are not established breeds because ten or a dozen or a score of generations back the pedigree, if they have any, runs back into the American woods, and yet here is a pig, bought in England at a high price, that two or three generations carries him back to the “progenitor of the race.”

To the American breeder the future looks bright. If we keep our sheep and swine pure, if we weed out vigorously, if we keep accurate records and breed for definite, correct and useful objects, it will not be many years before we shall not only have a great demand from our own widely-extended land, but from Europe, Asia and Australia, and that at prices which will liberally compensate us for all our skill, labor and patient waiting. We shall not be able to make as fine a display in the show-yard, but our animals will be far more valuable for the purpose of improving common stock, than those which are more promiscuously bred, and intelligent farmers and breeders will not be long in finding it out.

We all feel that America is destined to be the greatest country in the world. There is nothing lacking. We have abundance of

coal and iron and wood and stone, and so much silver that our creditors are afraid we shall pay our debts with it. We have railroads running in every direction, which must depend on agriculture largely for their future dividends. We have a rapidly increasing population, with free schools and the ballot box for all.

And the taste of our people is for other pursuits rather than agriculture. Those who stick to the farm, study the best methods of cultivation and manuring, and aim to produce the best articles at the least cost, would seem to be certain of their reward.

We shall have periods of depression in the future as in the past. But as long as people need food, the farmer is sure of a market for his products. He is sure of a fair compensation for his labor, skill and intelligence.

But this does not satisfy our young farmers. They see their brothers and friends winning wealth and distinction in other pursuits, and they ask if there are any prizes to be won in agriculture.

I believe there are in farming as great and as many opportunities for "doing good and making money" as in any other business of life. We are apt to think that all the best discoveries and inventions have been made. We think that Bakewell, the Collings, Ellman, Jonas Webb, Hammond and others, in the past, have so improved on cattle and sheep that there is nothing more for us to do except to retain and perpetuate the improvement. There cannot be a greater mistake. Notwithstanding all that science and art have done, the production of flesh, meat and fat, is still a very costly operation. To convert the carbon of grass and corn into the carbon of fat and butter, we have at present to submit to a great loss. Even with our best breeds of cattle and sheep, our most experienced feeders have to submit to a loss of at least ninety per cent. of the albuminoids of the food. In other words, if you feed a steer or a sheep a quantity of grass and grain containing 100 pounds of nitrogen, you rarely get in the growth of the animal consuming the food an amount of flesh, skin, hair and wool containing ten pounds of nitrogen. The other ninety pounds are, to a large extent, used to "run the machine." Is there no chance for improvement here? We have the experience of the past and the science of the future to aid us. We have not to grope our way in the dark as Bakewell did. We know what we want, and in what direction to look for it. Depend upon it, we shall yet have breeds of cattle,

sheep, swine and poultry, far superior as meat, milk and wool producers, to anything the world has yet seen. There are great opportunities for the young farmer of the present and the future. We have in this country seen a single cow sell at public auction for over \$40,000; and I suppose it is a fact that the late Mr. Hammond refused \$30,000 for one of his rams. In one of the northern counties of New York, where the thermometer goes down to 40 degrees below zero, an American breeder had a choice herd of Short-horn cattle. An English breeder purchased part of the herd at a high figure by telegraph. And only a few days ago an American breeder "cabled" to a brother breeder in England, and bought his entire herd of thorough-bred Berkshire swine. A few pounds of potatoes have been sold for \$500, and the seed of a well bred tomato for a much higher sum. In England, the offspring of a Yorkshire sow was sold for money enough to build a church, and in this country a breeder of Essex pigs has done nearly as well. The purchaser of a single pair of pure bred Essex swine has sold pigs for over \$10,000, and has a large herd left. And there is a real substantial basis to all this. A good, pure bred boar, when put to common sows, will get pigs that at five weeks old are certainly well worth \$1 a head more than common pigs; and such a boar as can be often purchased for \$20 or \$25 can directly increase this additional value to at least a thousand pigs. The breeder who sells him for \$20 gets pay for his skill and labor, and the purchaser and his neighbors obtain even still further profits. There are, therefore, *prizes* — grand prizes in agriculture, and they are obtained, not at the loss of some one else, but to the benefit of all concerned.

AMERICAN LIVE STOCK.

BY L. F. ALLEN.

Read before the National Agricultural Congress at Philadelphia, 1876.

The subject on which your executive committee has invited me to address you, viz.: "Our live stock interests, in their history, condition, and prospects," is far too broad in its scope to be compressed within the limits of an address on an occasion like the present.

Indeed, it can only be treated in a manner suggestive, rather than practical, or even historical.

The history of the live stock of the United States, from the first settlement of our Atlantic seaboard to its present wonderful expansion to the shores of the Pacific, would be almost a history of the people themselves, so close has been the association of their domestic animals with the fortunes of the agricultural population. The limits of this paper will only allow me to touch on the introduction of our domestic animals, and follow them briefly for about two hundred and fifty years of progress into their present condition and prospects for the future.

It is a very broad subject — the entire category of our farm-stock — embracing the nobility of the horse; the utility of the ass, and the hybrid offspring of both, the mule; the branches of the bovine race; the cow for milk, the ox for labor, and the bullock for beef; the sheep for its flesh and wool; the swine for flesh, lard, and oil; not omitting poultry, and even the “little busy bee,” which contributes to our household comforts and luxuries. You will therefore excuse the brevity of my remarks in each department, as any questions suggested may more fully be studied by reference to the many able works devoted to different branches of this interest.

First in order may be mentioned

THE HORSE.

His domestic history is coeval with that of mankind. He has contributed in no small degree to man's civilization. The most ancient of human annals, both sacred and profane, have eulogized him. His prowess has been extolled in histories of war; in domestic servitude his indispensable labors have been gratefully acknowledged; in luxury, he is an indispensable agent, and altogether the noblest animal ever under human control.

The first introduction of the horse to the vast territory now comprising the United States of America was in all probability made by the Spaniards on the coast of Florida, some years previous to the settlement of the early English and other European colonists on our Atlantic shores. History gives us little or no account of the breeds and characters of those early importations. The Florida Spaniards came out chiefly as gold hunters, and what horses they brought with them were in all probability of the Andalusian or

ordinary Spanish race, which were for many centuries bred by the Moors in Spain, and subsequently by their Castillian conquerers. Those horses were small in size, good in draught and under the saddle, hardy in constitution, and capable of undergoing great fatigue with negligent treatment; in fact, the most useful class of animals for them and their successors. Without much, if any, improvement, they now plentifully inhabit Texas, California, New Mexico, and Mexico proper. They do not really belong to the class "American horse," as we now understand that classification.

The settlers on our Atlantic coast, beginning about the year 1616, brought out the horses of their own native countries; Holland, Great Britain, Ireland, Sweden, Denmark, France, and Germany being thus laid under contribution. Great variety of character was thus introduced, and as their importers were men of narrow means, the animals were probably not of the choicest kinds, either in blood or quality, but very useful in the rude agriculture of the time. As these horses shared the hardships and privations of their owners, no marked improvement could be effected until the introduction of superior animals by later immigrants.

As the colonies grew in population and strength, attracting increased attention from the English government, under which they were all ultimately combined, immigrants of wealth, official dignitaries, and army officers brought out many valuable horses, some few accounts of which date back to the year 1700. Among them were choice specimens of the draught variety, as well as saddle horses; but the roadster, as we now know him, was then undeveloped, from the lack of good roads and light vehicles. Within a few years, however, after 1700, several fine blood horses of both sexes were known to be imported into Virginia, New York, and other states both north and south, many of the earlier and later immigrants of those states being great admirers of horse quality. These later importations were closely interbred and widely distributed, and crossed on the common mares of the country. Thus a rapid improvement was made in the style and appearance of our horse-flesh generally, as well as in their superior utility and value. So marked was the improvement that at the outbreak of the revolutionary war, our military officers were usually equipped with horses of superior blood, quality, and action. Indeed many of the brilliant achievements of our revolutionary army owed a share of their

success to the thorough mounting of the cavalry, and the excellence of the horses ridden by commanding and staff officers of the foot divisions and corps.

Recovering from the calamities and poverty of the war, as the circumstances of our people improved, the study and cultivation of their horses rapidly increased, and the earlier years of the present century produced many animals which, in high breeding, style, and execution of their work, equaled those of any other country, either on the race-course, under the saddle, in the harness, or the draught.

A brief notice of the various classes of horses now in approved use and cultivation among our American people may be germane to the subject; and, first in order may be named the

English Thoroughbred or Race-horse. As originally introduced into the American colonies, and since continued in our states, he has been the foundation of the highest excellence yet developed for all ordinary use, aside from the heavy and slower draught. About two hundred years ago, during the reign of Charles II, the race-course first began to attract the attention of the nobility and other wealthy aristocracy of England, and it has been continued down to the present time. As a consequence, speed, bottom, hardiness and endurance were the qualities chiefly sought in the development of the race-horse. For centuries previous, they had fine horses in England, yet they needed improvement, if possible, and choice selections were made from Egypt, Arabia, and the Barbary states, for stallions, and sometimes mares, to infuse their good qualities into the English blood. Many crosses of foreign stallions were made on the native English mares, and no doubt decided improvements were derived from their use, but, after all, the size and more muscular qualities retained by the descendants of those crosses were mainly of the original English character, and have been perpetuated both in England and America to the present day.

Late in the last century, and occasionally down to recent years, we have received importations of choice stallions from Asia and Africa, near the Mediterranean coast; but in justice I must remark that although some of them were of the highest symmetry in form, action and appearance, yet when crossed upon our well-bred mares, a superior impress on their descendants, except in few instances, has not been eminently noticeable. Did time permit, I might go into particulars within the limits of my own observation, but the

fact must remain with only a general remark of its truth. Whether the thoroughbred horse in the United States has been kept up to the standard of excellence at which he has arrived in England, or improved beyond him, an instance or two may determine. I have been unable to learn the best running time of the race-horse in England, and therefore a current comparison between the speed of the American and English horse cannot be made.

In the great national four-mile race of three heats, on Long Island, N. Y., in the year 1823, between the stallions American Eclipse, bred on Long Island, N. Y., and Henry, bred in Virginia, the first heat was taken by Henry, by a head only, in 7 minutes $37\frac{1}{2}$ seconds. The other two heats were taken by Eclipse in 7 minutes 49 seconds and 8 minutes 14 seconds, yet it was never exactly known what was the very best time Eclipse could make, only when matched with a nearly equal competitor, as he was called a lazy horse, and bore the whip freely.

The Kentucky-bred stallion, Lexington, on the New Orleans four-mile course, in the year 1854, won his race in 7 minutes $19\frac{3}{4}$ seconds.

Fellowcraft, also a Kentucky-bred stallion, won a race on the four-mile course at Saratoga, in the year 1874, in 7 minutes $19\frac{1}{2}$ seconds. These are the two shortest races ever made, so far as records are given, thus leaving the American thoroughbred the peer of any others in the world.*

We may well suppose that the superiority of the thoroughbred horse in the combinations of speed, action, wind, bottom and fineness of proportions has been fully determined, and that an infusion of his blood would be sought and worked into a large class of our miscellaneous-bred horses for other purposes than the race-course, or simply the gratification of taste and pleasure. Among the most notable class of the thoroughbred crosses upon the better ones of miscellaneous character is

The American Trotter, which we claim as solely an American production, within the last forty years, in the highest development of his speed.

A detailed history of the trotter would require many pages, for which no time can here be allotted, and the horse literature of the

* Since the above sentence was written, the horse Tenbroeck made a race at Louisville, Ky., in 7 minutes $15\frac{3}{4}$ seconds, beating Fellowcraft $3\frac{3}{4}$ seconds. — L. F. A.

country only can give it. Suffice it to say, however, that his descent has been largely drawn from the thoroughbred for many years back in his ancestry.

Trotting horses of celebrity have been recorded in the English periodicals of years ago, particularly Bellfounder, who trotted $19\frac{1}{2}$ miles in an hour; but in the trotting horse, classed by himself, England, as compared with America, has yet made no distinguished record; and that the American trotter has been most skillfully bred and trained to his recent astonishing achievements is a testimonial to our native enterprise beyond that of any other country. Thirty years ago, a horse that could trot a mile in three minutes was considered a remarkable animal. That three minutes has been gradually reduced from year to year, until in 1875, the mare Goldsmith Maid, at eighteen years of age, made her mile in 2 minutes and 14 seconds, and repeated it in the year 1876, in the same time. We now have scores of horses which make their mile in less than $2\frac{1}{2}$ minutes on the trotting courses of the country, as well as hundreds of them who easily do their mile in 3 minutes speed. Thus the American trotter stands at the head of his class over all others in the civilized world, as yet discovered.

If it be inquired in what remarkable manner the rapid speed and high qualities of the trotter have benefited the ordinary horse stock of the country, the answer is readily given in the fact that our better class of driving horses has been wonderfully improved in action, as well as in quicker movement, sureness of step, higher pleasure to all who either drive or ride after them, and in the increased marketable price they obtain for their breeders.

Next in order we may remark, in the absence of a more appropriate name, upon

The horse of all work, equally adapted to family use, the labors of the farm, or other purposes. I doubt if any part of the world, climate and soil considered, can show a better class of horses than those bred in the United States and the neighboring province of Canada. Made up of no particular breed, but an infusion of different bloods, they answer an admirable purpose for almost all uses, so far as size, endurance, muscular action, and longevity are concerned. A composite breed they may be called, if such a miscellaneous admixture can be called a breed at all. They are of all colors and sizes, from fourteen and a half to sixteen and a half

hands high, and weigh nine to twelve or thirteen hundred pounds in fair condition of flesh. They are bred and reared by all good farmers who make horse-rearing a branch of their industry, and are bought and distributed all over the country, in village, town and city, where, aside from mere fancy use, the horse is needed. Good stallions are kept for service in almost every neighborhood of the land, and of these the horse-breeder takes his choice for service to his mares, and succeeds in their production as his skill and care may determine. There is another example of the value of our horse of all work in Great Britain, which can boast as good horses of their kind, as any part of Europe. Since the street rail-car has been introduced into Great Britain, within the past year or two, it has been found that they had no class of horses especially fitted for that work. It required the sinewy, elastic movement, coupled with the medium size and endurance of our all-work horse. As a consequence, many hundreds of American horses have been purchased in our northern states and Canada for export to Britain, for other purposes as well as for street railways, and the trade is still continued to the mutual advantage of both countries.

Another class demanded for exclusive purposes is

The draught horse, proper, needed for heavy farm labors, and drawing the weighty loads in our commercial and manufacturing cities and towns, for which the ordinary horse of our farmers is incompetent. Of this class, if we have any which may be called "ancient" among us — say a hundred years or more — first in order stands the *Conestoga*, of Pennsylvania. The name is a local one, taken from a river of the central part of that state. He is supposed to be a native of Flanders, and to have been introduced by the German immigrants soon after they settled in Pennsylvania some time in the last century. This horse is still reared in Pennsylvania, but in smaller numbers than formerly, and in several other states, and is a decided favorite with those who breed and use them. Nearly or quite a hundred years ago, when the settlements of that state had extended westward over the Alleghany mountains, when towns began to spring up, and heavy transportation between them and the seaboard became necessary, the huge canvas-covered wagons, carrying six tons and upwards of merchandise, were drawn by spans of four to eight horses, with sometimes a ninth one in single harness as a leader. Those horses ranged from sixteen and a half

to seventeen and a half hands high, with bodies solid and bulky in proportion. Long before canals and railroads were known in our country, caravans of those teams were daily seen at all seasons of the year traversing the roads over the mountains between Philadelphia and Pittsburgh, and with bear skin housings upon the hames, and an arch of bells above them, with the driver seated on the near wheel-horse; a more picturesque spectacle of the kind could rarely be imagined. Their usual rate of travel was about twelve to fourteen miles a day. But those caravans, since the construction of railways, have mostly passed away, and the descendants of the stately teams are now devoted chiefly to agricultural uses, and the drays and wagons in the cities. It is doubtful if a better class of heavy draught horses than they have ever existed. It is claimed by some writers that the Conestoga has been bred to his high degree of excellence by crosses of the thoroughbred English horse, but without sufficient evidence of the fact, as for the last seventy years^s he has developed no trait of the blood-horse in his composition, and in his characteristics, has adhered solely to the type of his original progenitors.

Other foreign breeds of the draught horse of decided excellence have in later years been introduced among us, and are much approved. Among these may be named, in the order of introduction, the *Clydesdale*. This horse is of Scottish descent, of the largest size, seventeen to eighteen hands high, with a ponderous body, stout limbs, hairy at the fetlocks, of high and noble carriage, and unsurpassed in weight and strength. They occasionally reach a weight of seventeen, even eighteen hundred pounds. They were first introduced by the Scottish farmers into Upper Canada, where they have been bred in considerable numbers, and are still annually imported. There have been also some direct importations from Scotland to the United States. Many of the Canadian importations have found their way into several of our states, where, for heavy agricultural and other draught, they serve a valuable purpose.

The *Suffolk Punch*, so called, is a draught horse of English breeding and descent. He is of large size, but smaller in bulk and stature than the Clydesdale, somewhat similar in style of body and limb, but without the hairy fetlock. A few of them have been imported into Canada and the United States, but have not yet acquired the popularity of the Clydes, although of decided excellence, and a model of their kind.

There are two other classes of draught horse introduced into the country, somewhat similar in character and probable descent, and may be classed in nearly a parallel category.

The *Normans* may first be named as earliest in importation. They are natives of France, not of like style altogether, with the draught horses already named, as they embody more speed in action, with great strength of limb and power of locomotion. They are largely worked in the heavy diligence traveling carriages of France, which they move at five to eight miles an hour on the roads, holding a good trotting gait. They are also used for drawing heavy loads in the cities and towns, and in agricultural labor. Their usual size is sixteen to seventeen hands in height, compact in body, symmetrical in shape, clean in limb, hardy in exercise, and enduring in labor. The stallions have been of decided service in crossing with our mares of "all work," as well as in breeding with mares of their own kind; for the mixed uses to which they may be applied are a valuable addition to the horse stock of the country.

Next to, and partially associated with the Normans, may be named the *Percherons*. As a rule, they are somewhat larger in size. They are also natives of France, and applicable to the same uses as the Normans, and of equally good shape, style and appearance. They have been considerably imported into several of our states, of late years, and received with approbation among those who need a beast of their kind. They may be pronounced a decided acquisition, and it is to be hoped that the enterprise of their importers may be liberally rewarded. From the numbers of both sexes now here, a healthful production of their kind, both in general excellence and purity of blood, may be anticipated.

Nor in our horse category should the lesser, and even diminutive pony be overlooked. For a century or more past, they have been imported into the United States, of different character and style, from the Welsh and English pony of twelve to thirteen hands, down to the diminutive little Shetland from the northern isles of Scotland, of three feet or less in stature. They are usually symmetrical in shape and appearance, of wonderful strength, docility, hardiness and endurance. Although of little use as laboring beasts, they minister largely to the pleasure of our families, are the delights of our children, and worthy of attention and propagation as innocent promoters of luxury and enjoyment. Under proper care and attention,

they thrive as well in America as in the countries from which they came to us.

THE ASS.

This useful and indispensable animal — useful in mule breeding as well as in the propagation of his own species, is among the most important items of our farm stock, and worthy of a discriminating notice. On the eastern continent, their utility is of as ancient date as that of the horse, and among many nations and people their labor is indispensable. They were early brought into our American colonies, and from their first introduction until some years of the present century were widely used in the Atlantic, Northern and middle states for the propagation of mules for the West Indies and our southern domestic markets. Since about the year 1820, mule breeding and rearing in the eastern states being superseded by the cheaper facilities for producing them in several of the more western states, the ass has ceased to be either an article of breeding or commerce where they were first imported, and is now rarely known within their boundaries. Yet in the localities where now most used, he has been improved both in size and quality. Numerous importations have been made during the last seventy years, from Spain, Malta and other adjacent countries, of the best blood of his race, and their produce, bred on the females of American stock, have so improved them that we can now exhibit the domestic ass as equal, if not superior, to those of any other country. Would time permit, we might even go into particulars, to prove our assertion, but it must now suffice to state the facts in general terms. With us he is rarely used as a laboring beast, his services being superseded by the mule, as our country is happily free from that low class of labor in which his drudgery is needed.

THE MULE.

The origin and history of this peculiar animal is almost as ancient as that of his progenitors, the ass and the horse. He has ever been useful in the industries of the people of many nations, both ancient and modern, and to the development of certain branches of our American agriculture, traffic, and commerce; he is widely appropriated, and indispensable. The early mules of the Eastern states were small in size, seldom attaining a height of more than fifteen hands, and usually less, yet of great strength in labor, endu-

rance, and longevity; but the western mule has far exceeded him in size, weight, and adaptation to the heavier work demanded of him. It is now not uncommon to find him sixteen, even seventeen hands high, with a body in proportion, and frequently a comeliness in form exciting the admiration of those who are partial to his employment. His uses in the various labors demanded of him are so well known that it is unnecessary to name them; and in comparing him with the mules of other countries, it may be truthfully said that the American mule has no superior, and few equals, and thus constitutes an important staple of our agricultural wealth. A proper history of the progress and present condition of either the American ass or mule has never yet been written for publication, other than in detached scraps or pamphlets, yet they are subjects well worthy the employment of an able pen, and it is hoped that such a labor will be undertaken by some one fully competent to its execution.

AMERICAN CATTLE.

To give a history of the rise, progress, and present condition of this important department of our industry, would be to write an elaborate book, the like of which was written some four years ago; but it has fallen, I fear, too seldom under the notice of those whose interests would be promoted by its perusal, even under its shortcomings and imperfections. However that may be, I shall briefly, yet as accurately as my observation may allow, give some notes and suggestions on their very wide importance. Neat cattle, in the sense usually understood with us, or, more strictly, animals of the bovine race, were introduced into our Atlantic states soon after the first settlers came over from Europe. Those settlers brought with them animals reared in the vicinities from which they themselves came, of various nationalities. Their cattle were of no particular breeds or distinctive names, that we have learned, but such as served the wants of the settlers in the production of milk, the propagation of their kind, their meat for food, and their labor for agriculture — animals of a common order only, as improved breeds in those days had not received much attention in the countries from which the immigrants came. Anterior, however, to the colonial settlements in what are now the United States, the Spaniards had introduced many cattle from their own country into the territories of Mexico, and further south, and in the broad, luxuriant pastures of those

regions they multiplied into numerous herds, with little attention to their improvement, as they are now found and known; but of late years, since the annexation of Texas, New Mexico and California, they have become quite an article of commerce and consumption in other states.

In nearly all the grass-producing or grazing portions of our older states, as the people progressed in their modes of agriculture, their cattle, increased and multiplied, were usually well cared for, and answered all the purposes demanded of them. In some sections of country they were better cared for than in others, and possibly improved in quality over the originals from which they sprung; yet as the settlers, after some years, began to migrate to different localities, taking portions of their herds with them, the cattle became intermixed with those derived from other nationalities, so that in process of time a general intermixture took place, and the name "common cattle" was only known in its application. This name is now continued to distinguish them from the improved breeds of later years.

Occasionally, and at different times in the last century, tradition has informed us that enterprising men of wealth had imported some choice cattle of "improved" blood from Europe — the names of the breeds not remembered — but they were so few, and so little attention was paid to their propagation in their own distinct lines, that they soon became amalgamated with the common stocks. Yet, that the infusion of their blood among the others to some extent made their progeny better than the older herds, we have good reason to believe, particularly as the working oxen of the eastern states, and their superior dairy cows, for some generations past, have been held in high estimation. This assertion may, however, be qualified by saying that the oxen were chiefly used in labor on the farms, and the dairy formed a considerable staple of their agriculture; consequently drawing closer attention to the cultivation of their cattle. In the more fertile soils of the middle states, which were chiefly grain growing, horses were used for labor, and cows in the dairy mainly for domestic consumption, while the steers and bullocks grown by them were for meat purposes, or, if for labor at all, only for a few years, until the forests were subdued and the land made clear for horse cultivation.

BREEDS OF CATTLE.

Of improved cattle we now have several valuable and distinct varieties. A few remarks on each of them must suffice; and first in order, as they are by far the most numerous in attracting the attention of our farmers, breeders, and graziers, I name the

Short-horns. — Soon after the revolutionary war, and previous to the year 1800, a few animals of this breed were imported by two different Englishmen into the city of New York. The fact of their importation is the chief thing known about them, as only a few results are now recognized from their breeding. One of the imported cows was taken back to England — “the American Cow,” so called, of the English Herd-Book — from which, afterward, many noted and valuable animals descended. About the same years, also, two different importations of cattle, supposed to be Short-horns, were made from England into Baltimore, and taken to the valley of the south branch of the Potomac river, in Virginia, and from there, within a few years afterward, some of their descendants were driven to the blue-grass region of Kentucky, where they were carefully propagated, and in after years, crossed by bulls of still later importations, became an important item of the cattle wealth of that state.

We hear of no further Short-horn importations until after the war with England, in 1812–15. Soon afterward, several importations of them were made into New York, Massachusetts, Kentucky, Maryland and Pennsylvania. They were industriously bred by their enterprising owners, and the valuable qualities of their own distinct blood, and the improvement through their crosses upon the common cows of the country, for most useful purposes, soon gave them a popularity and dissemination attained by no other breed, and since followed by numerous importations into many of our states and the Canadas. They now stand largely in excess of numbers over all other foreign breeds put together. The various merits of this breed it is not now necessary to discuss, as different opinions may be entertained regarding them, but the fact may be stated that their recorded pedigrees, in the Herd-Book, now number more than 60,000 well bred animals, and at the present time they are increasing more rapidly than at any previous period in their history.

Devons. — This is a strikingly distinct breed in form and quality,

medium in size, uniformly red in color, comely in appearance, and of decided excellence: the ox for labor, as his agile form indicates; the cow for milk, when cultivated for that object, and the uniform excellence of their flesh when properly fed and matured. Nor can there be any doubt of the original distinctive blood of the Devon. Their advocates in England claim them to be as ancient in blood and descent as the Roman rule in that Island, many hundred years ago; but by what evidence, other than their peculiar style of form and character, is not known. That animals allied to them in blood were brought to America from England so long ago as in the seventeenth century, is altogether probable, as many of the native New England cattle, for many generations back, have borne strong resemblances to the Devon in some of their characteristics.

The first authentic knowledge we have of thoroughbred Devons being imported into our country was in the year 1817, by Messrs. Caton and Patterson of Baltimore, Md, and in the next year by the late distinguished statesman, Rufus King, of Long Island, N. Y. By those gentlemen they were bred and cultivated, and herds from them considerably disseminated in different sections of the country: Later importations of them have been made into Maryland, Massachusetts, New York, and some other states. There are now several fine herds of them existing in different sections of the country, but we regret to say, not in the numbers which their good qualities should command, but of excellence quite equal to the original importations. It is hoped that they will still further increase, until they become numerous among the standard breeds of our country.

Herefords.—Next in order of improved cattle, this breed may be named. The first distinct account we have of thoroughbred ones of the kind were an importation by the great Kentucky statesman, Henry Clay, in the year 1816. An ardent admirer of fine stock, he saw them in England in 1815, and purchased two pairs of bulls and cows, which afterward came out and were placed on his farm at Ashland, near Lexington. Whether any, or what number of thoroughbred produce came from them, we are not informed, as no record was kept, and they are not now known in Kentucky. The bulls were bred to some of the native cows in their vicinity, but the Short-horns, which were imported there soon afterward, superseded them in propagation, and we hear nothing further of their produce.

About the year 1824, one or more Hereford bulls, and perhaps a cow or two, were imported into Massachusetts. We hear of no thoroughbred produce from them, but the bulls were bred to a limited extent on common cows, and no marked result followed, except some grand working oxen, afterwards fed into excellent carcasses of beef. In later years, a few importations of choice animals were made into New York, Ohio and Upper Canada. Their descendants have been scattered in small herds into several states, but, we regret to say, not with the popularity which such excellent grazing and beef-producing animals merit. As flesh-producers, they strongly rival the Short-horns, and in size, nearly equal them. They are mainly red in color, with white or mottled faces, and occasionally white legs and bellies, and stripes along the back. In England they are claimed as an ancient breed, and their distinctive uniform appearance well bears out the assertion.

The three English breeds already named may be classed as the best flesh-producers.

Next in order may be named the breeds more distinctly used for dairy purposes; the

Ayrshire. — This is claimed as a dairy or milking breed, and wherever known, either at their native homes in Scotland, or in their later ones in the United States, are esteemed and cultivated for that exclusive purpose. They are said, by authentic history, to have been originated about a century ago in the district of Ayrshire; whence the name was taken, by a cross of Short-horn bulls from the north of England, on the common or native Kylvie cow of Scotland, and cultivated into their present excellent dairy qualities by careful and persistent breeding, until their characteristics have become fixed and enduring. They were first imported in small numbers to America, between the years 1820 and 1830, as nearly as can be ascertained, and within the last thirty years, in such numbers as now to be found in many considerable herds. They are highly esteemed by those who are partial to them for their large yields of milk, which render them much more profitable for dairy uses than the common cows of the country. In size, they are about equal to our common cattle; in color, usually red or brown, more or less mixed with white; in shape, more like the Short-horn than any others, although lacking their fine contour and comeliness of appearance — a valuable breed of cattle.

Holsteins or North Hollands. — This breed, in its present characteristic of great milk-producing quality, has been introduced here within the last twelve or fifteen years, from Holland, and first, we believe, imported by the late Mr. Chenery, of Boston, Mass. They are of large size, nearly equal in weight and bulk to the Short-horns, and have some of their strong points of character, but coarser, less refined in figure, and black and white in color. For the few years in which they have been on trial here, their dairy development has been remarkable in the *quantity* of their milk. As a flesh-producing beast they are claimed to be good, but the economical result in their consumption of food to weight of flesh has not been thoroughly solved. They are unquestionably good cattle, far superior to our native cows; and when sufficient time has passed to develop their full qualities, they may stand in the first class of dairy cows. They are evidently of an ancient stock, originating possibly in Holstein, or North Holland, and may, in some branches of their ancestry, have had an affinity with the far-back, unimproved Short-horns, although in color and general appearance now much unlike our Short-horns of the present day.

Last, but not least in importance, may be named the

Alderney, Jersey, and Guernsey, from the Channel Islands of Britain, near the coast of France. These breeds, or varieties, are named together, as they are unquestionably of common origin, and owe their present distinctive qualities in appearance to their manner of breeding, and the tastes and preferences of their long-time propagators. That they are an ancient breed there can be no doubt, probably French in origin, as the cows of the provinces of Normandy and Brittany bear a considerable resemblance to them; but isolated as they have been from the mainland of the continent, during the centuries of their cultivation on the islands, they have assumed the characteristics which so readily distinguish them. In size, they are smaller than our native cows, delicate in form, unique in shape, diversified in color, and blood-like in appearance. The prime quality claimed for the cow is the exceeding yellow color and rich quality of her milk, cream and butter, in all which she stands without a rival, although her quantity of milk is moderate, compared with the weight of butter which it yields. For the production of meat, the Channel Island cow, or even bullock (whenever suffered to become a bullock), is inferior, the anatomy being angu-

lar, and not capable of making much flesh in the choicest parts of the carcass. Within the last thirty years they have been numerous imported into our states, and are much sought in the vicinities of our large cities, towns and villages, as family cows. They are easily kept in small paddocks or close stables, where their rather delicate natures can receive the attention, kind treatment, and choice food usually bestowed upon them.

For all these improved breeds, herd-books containing their genealogy, by way of pedigree, are kept in the United States, as well as in their native countries, and from them a full knowledge of their descent and blood is readily obtained by all who choose to inquire into their breeding. Prices might be quoted of the sale values of several of these breeds of cattle — some of them seemingly extravagant in amount — but such statistical reference is not demanded in this limited discourse, rather leaving it to the tastes, judgments and fancies of those interested in their breeding. The introduction of these improved breeds has added enormously to the value of the neat stock of our country, and their further dissemination is yet to add untold millions to its productive agriculture. Slow as farmers, cattle-breeders, graziers and dairymen have proverbially been in the improvement of their herds, a rapid and more intelligent interest is every year manifested in their increase.

In addition to the breeds of cattle already named may be a few others of foreign origin, introduced at different times by way of experiment or personal gratification; but as they have taken no strong hold on the attention of our stock-breeders, a further notice of them may be omitted, while in the grand specimens of the various breeds which have been mentioned we may assert, without contradiction, that no country in the universe contains better herds than the United States of America can now exhibit.

The subject of our neat cattle can hardly be dismissed without an allusion to an important item of their increasing value in *fresh beef exportation*, which has recently been developed by the demand for fresh carcass meat from abroad, particularly in Great Britain. Refrigerators have been fitted up in Atlantic steamships, and, by the aid of ice, many tons of beef, in quarters of the carcass, have already been, and unlimited tons more may continue to be, transported to Europe with entire safety, and in perfect freshness. The prices for which it has been sold in the London and Liverpool mar-

kets have proved equal to those for the best qualities of their native beef, and profitable to the shippers. There is, however, a condition attached to our successful exports, which is, that the meat be of the best quality, and that quality can only be obtained from animals of improved breeds which have been partially described. We have only to proceed in the cultivation of those breeds, in order to add a wide, almost illimitable field of production to the neat stock interests of our country.

SHEEP.

These were early introduced into our American colonies as companions of the horses and cattle brought by the settlers. They were of the kinds then common to England, Scotland, Ireland, and perhaps the western coast of the European continent, of various breeds, as they then locally prevailed, but without much merit, other than a tolerable carcass of ordinary flesh and a moderate fleece of coarse wool. They were so kept and propagated, with possibly an occasional importation of a better kind from England, but it was not until late in the last century that Bakewell, Ellman, and other enterprising breeders, made their experiments in different breeds, which resulted in any considerable improvement in their condition and appearance. Thus the American sheep were chiefly of an inferior character.

Merino. In the early years of the present century, the American ambassadors at the courts of France, Spain and Portugal, during the intense commotions of the Bonapartean wars, purchased and shipped to the United States many hundreds of Spanish Merino sheep. They were of the fine-wooled varieties, named as you will find in our books on sheep husbandry. Their introduction here was hailed with great satisfaction, and as our infant woolen manufactories were then just emerging into existence, great importance was given to their propagation, not only in their own purity of blood, but as valuable crosses on our common flocks in increasing and refining the qualities of their wool. From those days forward to the present time, the cultivation of the better qualities of wool has been the study of numerous flock-masters in various parts of the United States, suitable to their rearing, and the sheep interest now presents an important branch of our agricultural production and wealth. The Spanish Merino has evidently been much improved in its American cultivation, not only through the crosses of more

recent importation by several of our enterprising Americans from the royal flocks of France, Saxony and Silesia, upon the earlier Merino ewes, but by our own flock-masters at home, so that at this day, no fine-wool sheep in the world excel, and few equal, the *American Merinos* in the heavy products of their fleeces, or the size and stamina of their bodies. We might examine the statistics of their annual production, aggregating millions of dollars in value, did opportunity permit, but we may rest content with the general facts which have been stated, and the progress we have made in their cultivation, not only in the fine wool but in the other varieties.

The Courser-wooled Mutton-sheep, so successfully bred in England during the last seventy years, we have for the past thirty years adopted by frequent importations. They have been successfully propagated in their own purity of blood, and by their crosses on the common flocks, raised our inferior ones to a value hitherto unknown in their kind. We have now the Bakewell, or Leicester, the Cotswold, and Lincoln, all of the most valuable long-wool varieties. We have also the Southdown, the Shropshire and Oxford Downs of the middle wools, abundant in fleece, massive in the quantity and delicious in the excellence of their flesh, so that Americans may, within the next decade or two, become, as they have never yet become, a partially mutton-consuming people, and ship thousands of dressed carcasses to Britain, as is now done with our fresh beef.

SWINE.

In the category of other domestic animals brought into our country with the earlier immigrants, came also this animal, indispensable for domestic consumption, constituting an important item in our exports abroad. From the earliest history, swine have been connected with farm husbandry, as well as untamed rangers of the forest, in which latter condition they even now exist in some of the uncultivated sections of the eastern continent. To what degree of perfection, or even improvement, they were cultivated in ancient times, history gives us little or no account; but we do know that for many years previous to the present century, and for some years since, the common swine of the United States were inferior in the quality of their flesh, ungainly in form, slow in arriving at maturity, and repulsive in almost every phase of their character as companions to our other agricultural stock. Yet in eastern Asia, and in

portions of Europe, perhaps for a century or more past, considerable advances had been made in the improvement of their domestic swine, as a few years after the revolutionary war, importations of improved animals of the kind were introduced into our country, and among them we have accounts that General Washington had some of them which were sent over as a present to him at Mount Vernon, from England. Early in the present century, also, the East India merchants of Massachusetts and New York imported some fine specimens from China and India, which were afterward considerably crossed on the common stocks of our eastern states, and much improved them both in the qualities of their flesh and domestic habits. Still, until within the last fifty, or even forty years, the mass of our farmers throughout the country, and more particularly in the western states, bred and reared swine of ordinary character, answering, to be sure, the main requirements of consumable flesh, but inferior in its high condition to that now found in our markets, either for domestic consumption or exportation.

The various foreign breeds to which we are indebted for our present swine improvement are too numerous to mention, and their history in detail, though quite interesting, is too long to narrate, but the agricultural literature of our several states will fully inform all inquirers of their various progress and present status. As an evidence of the present interest in their production and improvement, an association of swine-breeders has recently been formed, whose headquarters are at Springfield, Ill. They have issued a swine herd-book for the Berkshire breed, after the style of the various cattle herd-books, in which their genealogy and high excellences are chronicled. Not that we would exalt this particular breed above others, perhaps equally meritorious, but to signalize the enterprise of our farmers, and the magnitude of the pork and lard-producing interest of our country, amounting to hundreds of millions of dollars annually. The swine of the United States now consume a great share of the product of the almost illimitable corn fields of our western and upper southern states, thus converting a great portion of that valuable grain into a portable commodity, which, without them, would be either a drug, or an almost inconvertible staple of their agriculture. We may, in view of the progress we have made in swine cultivation and improvement, place the United States superior to that of any other country in the world.

POULTRY.

To descend to a smaller, yet quite indispensable, item of food consumption in our households, as well as ornamental accompaniments of domestic life, the varieties of our poultry may well and profitably be mentioned. They, too (the turkey excepted), came over with the early settlers of our American colonies, and have been the intimate associates of our people ever since. They constitute an important part of the luxury of our tables, both in their flesh and eggs, the aggregate commercial value of which, were it accurately reckoned, amounts to millions of dollars annually. The poultry literature of our country is voluminous, both in books and various agricultural periodicals, to which those in search of information may readily refer. As a general remark, it may suffice to say that importations from foreign countries, of various breeds of them, have been frequent and of rare quality, both in the estimation of the economist who propagates them for profit, as well as the amateur, for the gratification of his taste in their selection and exhibition. Poultry societies have become numerous throughout the land, and the annual exhibition of their various specimens have been marvelous in excellence, beauty and variety. The cultivation of the finer varieties has arrested the attention of men and women of taste, wealth and refinement to such an extent that the perfection of our poultry may even be classed among the fine arts of animated nature, and challenge competition with any portion of the universe.

Least and last of the domestic creatures which engage our attention may be named a small insect,

THE HONEY BEE.

Time, long before and ever since the bee made its honey in the carcass of the dead lion slain by Sampson, has noted this useful insect in its companionship with man, as well as in its wild habitations in the wilderness, where climate and vegetation favored its propagation. It furnishes us the most luxurious of sweets in its honey, and an important commodity in its wax. The aggregate annual commercial value of our bee product is probably hundreds of thousands of dollars, being difficult to determine, from the want of current statistics; yet all who choose to investigate may be assured of their importance. Of bee literature, we have public jour-

nals devoted to their interest, many volumes of printed books, and divers essays in our agricultural periodicals; and were I to relate the annals of my own personal companionship with them for many years past, I should only tell you, that at the present day they are both as untamed and uncivilized as when the great patriarch, Noah, let them out of his ark to forage among the renewed plants and flowers at the foot of Mount Ararat. They live, propagate and subsist by *instinct* alone, and not all the invention or ingenuity of man has been able to improve their qualities, to change their habits, or invite them to a companionable docility. Even the importation of the superior Italian bee into our country in late years, and crossing them on our common stock, has not perceptibly improved their habits. So, lovable as they may be in their sweets and wax, they are barbarians now, as ever, and equally at home in the hollow trunk of a tree in the wildest forest, as in their hives amid the flowers of the field, or refinements of the most highly cultivated orchard and garden.

Now, gentlemen, in all this long dissertation, I have probably told you nothing new, and little which will prove instructive, or even worthy of publication. Yet we have seen that from the rudest material at the beginning of our agricultural settlements, we have made decided progress in the breeding and cultivation of our domestic animals, and that chiefly, within the last century. We find that much has thus far been accomplished, and with the aids and lights now at our disposal, we trust a still more rapid and a more widely disseminated progress can be achieved in the future.

The present value of all our varieties of domestic live stock in the United States and its territories may be safely estimated at two thousand millions of dollars, and their annual product of all kinds at one thousand millions more. Full thirty per cent. has been added to the aggregate *per capita* value of our *graded* stock by improvements in their breeding within the last fifty years, and at no increased cost in their keeping, although those improved animals as yet extend over only a fractional part of our country. What then may be the increased measure of value when — if such a thing be possible — that improvement shall embrace the farm-stock of our entire broad nationality? It must be almost incalculable.

In review of this live-stock history and progress which has been

considered, I wish here to note, and with somewhat of emphasis, that, with the exception of our finer classes of horses, the breeding, rearing and cultivation of our farm stock has been hitherto considered, by those not intimately acquainted with it, as an occupation of a rather vulgar order, and conducted by men of duller intellects than those engaged in professional, scientific, commercial or manufacturing pursuits. Such a supposition is a profound and ignorant mistake, based only on an entire misapprehension of the study of animal physiology. The cultivation of domestic animals, and their improvement, through generations of their kind, into the admirable specimens which we now see, is as much a branch of the fine arts, applied to animal physiology, as are the superb specimens of statuary and painting which you to-day witness in these Centennial rooms, produced by the successors of Phidias, Michael Angelo, Raphael, or Claude Lorraine.

Among the improvers of domestic live stock within the last two centuries, both in Europe and America, will be found men of the highest intellect, learning, refinement, position and wealth, whose studies have been drawn to the development and exaltation of the qualities of their animals. I need not recount the names of distinguished Europeans, past and present, who have lent their influence and labors to that pursuit; nor to Americans, from George Washington, of Virginia, Chancellor Livingston, of New York, Henry Clay, the great Kentucky statesman, and a large number of eminent men of all professions and pursuits, aside from enterprising farmers proper, whose main business has been that of breeding and rearing improved classes of stock — names both dead and living, all too numerous to mention. Nor has the attention of those breeders and improvers been limited to the most valuable classes of stock, but equally so to those of minor commercial value. Women, too, of equal rank and position in society with men, both in Europe and America, may be classed in the noble array of fine-stock improvers — all in their labors, benefactors of mankind.

God has appointed our lot in a country of diversified climates, and blessed it with a wonderful fertility of soils. If a due improvement of our advantages be hereafter neglected, on those guilty of that neglect will rest the penalty; and yet, when another Centennial of American Independence shall arrive, we trust that those who then succeed us may rejoice, as we, their progenitors, now do

at the present, in a still higher advancement to crown their labors with thanksgiving and gratitude to the benignant Father of Mercies, for the successes they shall achieve and enjoy.

AMERICAN DAIRYING.

BY X. A. WILLARD, A. M.

Read before the National Agricultural Congress at Philadelphia, 1876.

GENTLEMEN:—Dairying is of very ancient origin. The manufacture of cheese and butter was known and practiced more than three thousand years ago. In the earliest history of the human race mention is made of cheese and butter, and there is reason to believe that these products were known and used as food many ages before the earliest record of them by writers of antiquity.

The earliest notice of the manufacture of cheese in the Bible is where Job, complaining of life, says: "Hast Thou not poured me out as milk, and curdled me as cheese?" David was sent to his brethren in the Valley of Elah with this injunction: "Carry these *ten cheeses* to the captain of their thousands and look how thy brethren fare."

Homer, the grand old poet of the Greeks, makes record of the dairy in the following lines, written nearly a thousand years before the Christian era:

"Around the grot we gaze, and all in view
In order ranged, our admiration drew,
The bending shelves with loaves of cheeses pressed,
The folded flocks, each separate from the rest."

Julius Cæsar says the principal food of the Germans in his day consisted of milk, cheese and flesh, and he gives a similar account of the Gauls or ancient inhabitants of France.

Allusion to butter is several times made in the Old Testament, but the earliest is in Genesis, in Abraham's time. When he had washed the feet of the angel visitors, and given them a little cold water, it is recorded: "He took butter and milk and the calf which he had dressed, and set it before them, and he stood by them under the tree and they did eat."

Thus it will be seen that the products of the dairy — milk, butter and cheese — have a genealogy that goes far back of the “Dooms-day book.” They have a history forty centuries old, and this it would seem must be old enough for the most fastidious lover of “old cheese.”

But what must be considered remarkable in this connection is that these products have been regarded in all ages of the world as luxuries, or among the highest types of human food. Abraham set before his angel visitors “*milk and butter*, and they did eat.” Now with all due respect for the wonderful progress of this century, and the skill of our “gilt-edged butter makers,” can we not reasonably infer that the butter of Abraham’s time, fit to be set before the angels, could have been anything less than excellent, and doubtless it was far superior to much of the butter made at this day, which I am sorry to say is hardly fit to set before even the wicked.

But I have proposed to speak to you upon “American Dairying,” which at best as a specialty can hardly be considered a century old. Dairying as a specialty was practiced in England and Holland, and in other parts of Europe previous to the 16th century, and the early emigrants to this country must have brought with them the art of butter and cheese making. But previous to the year 1800, there seems to have been no considerable number of dairies grouped together and prosecuting the business as a specialty in any part of America. Most farmers in those days kept a stock of horned cattle — animals raised for beef, for working oxen, with cows for breeding and for producing milk, butter and cheese to supply home wants.

The farming of those days was of a mixed character, nearly every want of the family being supplied from the farm.

In the fall of 1800, a very exciting election was had for President of the United States, the candidates being Mr. Adams and Mr. Jefferson, and to this circumstance are we indebted for a bit of dairy history—the first really notable affair concerning the dairy that had as yet occurred in the New World. In those days one of the great pulpit politicians of New England was Elder John Leland.

Politics ran high, and the contest between Federalists and Democrats was almost as bitter as that between Republicans and Democrats to-day. Puritan pulpits launched their thunderbolts against Jefferson, the great Democratic leader, charging him with being an infidel of the French revolutionary school. “In the little town of

Cheshire, nestling among the middle hills of Massachusetts," says Mr. Burrett (to whose history of the affair I am indebted), "a counter voice of great power was lifted up from its pulpit against the flood of obloquy and denunciation that rolled and roared against Jefferson and Democracy. This was Elder John Leland, one of the most extraordinary preachers produced by those stirring times, and he preached such stirring *Jeffersonian* Democracy to the people of Cheshire, that for generations they never voted anything but a "straight Democratic ticket."

Democracy prevailed and Jefferson was elected President, and no man had done more to bring about this result than Elder John Leland, of the little hill town of Cheshire, Massachusetts. Besides influencing thousands of outsiders in the same direction, he had brought up his whole congregation and parish to vote for the father of American Democracy. Democracy in those days, I fancy, was different from the Reform Democracy of to-day, but be it as it may.

He now resolved to set the seal of Cheshire to the election in a way to make the nation know there was such a town in the republic of Israel.

He had only to propose the method to command the unanimous approbation and indorsement of his people, and he did propose it to a full congregation on the Sabbath. With a few earnest words he invited every man and woman who owned a cow to bring every quart of milk given on a certain day, or all the curd it would make, to a great cider mill belonging to their townsman, Capt. John Brown, who was the first man to detect and denounce the treachery of Benedict Arnold in the Revolution. No Federal cow was allowed to contribute a drop of milk to the offering lest it should leaven the whole lump with a distasteful savor. It was the most glorious day the sun ever shone upon, before or since, in Cheshire. Its brightest beams seemed to bless the day's work. With their best Sunday clothes under their white tow frocks came the men and boys of the town, down from the hills, up from the valleys, with their contributions to the great offering, in pails and tubs. Mothers, wives and all the rosy maidens of these rural homes came in their white aprons and best calico' dresses to the sound of the church bell, and that called young and old, rich and poor, to the great co-operative fabrication. In farm wagons, in Sunday wagons, in carts and all kinds of four wheeled and two wheeled vehicles

they wended their way to the general rendezvous, all exuberant with the spirit of the occasion. It was not only a great glad gathering of all the people of the town, but of half of their yoked oxen and family horses, and these stepped off in the march with the animation of a holiday.

An enormous hoop had been prepared, placed upon the bed of the cider press, which had been well purified for the work, and covered with a false bottom of the purest material. The hoop resting on this formed a huge cheese box or segment of a cistern, and was placed directly under three powerful wooden screws which turned up the massive head block above.

A committee of arrangements met the contributors as they arrived and conducted them to the great, white, shallow vat into which they poured their contingents of curd, from the large tubs of well-to-do dairymen to the six quart pail of the poor owner of a single cow. When the last contribution was given in, a select committee of the town addressed themselves to the nice and delicate task of mixing and flavoring and tinting such a mass of curd as was never brought to press before. But the farmers' wives of Cheshire were equal to the duty and responsibility of the office.

All was now ready for the *coup de grace* of the operation. The signal was given; the ponderous screws twisted themselves out from the huge beam overhead with even thread and line. And now the whey ran around the circular channels of the board bed in little foamy, bubbling rivers. The machinery worked to a charm. The stout young farmers manned the long levers; the screws creaked, and posts and beams responded to the pressure with a sound between a puff and a groan. It was a complete success. The young men in their shirt sleeves, and with flushed and moistened faces, rested at the levers, for they had moved them to the last inch of their force. All the congregation, with the children in the middle, stood in a compact circle around this great press. The June sun brightened their faces with its most genial beams, and brought into the happiest illumination the thoughts that beat in their hearts. Then Elder Leland, standing up on a block of wood, and with his deep-lined face overlooking the whole assembly, spread out his great toil-hardened hands, and looking steadfastly with open eyes heavenward, as if to see the pathway of his thanksgiving to God and the return blessing on its descent, offered up the gladness and

gratitude of his flock for the one earnest mind that had inspired them to that day's deed, and invoked divine favor upon it and the national leader for whom it was designed.

When the cheese was well cured and ready for use, it weighed *sixteen hundred pounds*; but as it could not be safely conveyed on wheels to its destination, it waited until midwinter, then it was placed on a sleigh, and no one but Elder John Leland could be entrusted with the precious load. He took the reins, driving all the way from Cheshire to Washington, full five hundred miles, receiving testimonials and varying acclamations in the towns through which he passed. Arriving in Washington, Mr. Jefferson received him in state, the big cheese was duly presented and speeches made, and the president's steward passed a long, glittering knife through the cheese, taking out a deep golden wedge, which was served with bread and ale in presence of the heads of departments, foreign ministers, and many other eminent personages. It was highly complimented for its richness, flavor and color, and was the most perfect specimen cheese ever exhibited at the White House. Then Mr. Jefferson sent a great golden wedge of the cheese back to the makers, which they ate with double relish, as the president's gift to them as well as theirs to him.

THE OLDEST DAIRY DISTRICT IN AMERICA.

Few years previous to this memorable event, a sturdy young farmer from New England crossed the Hudson and slowly made his way up the valley of the Mohawk, which has been denominated the "Gateway of the Continent." He was the first who began cheese dairying in Herkimer county. He came into the country on foot. He was rich in health and strength. He had eight silver shillings in his pocket, an axe on his shoulder, and two stout arms to swing it.

Except along the Mohawk, nearly the whole country was then a dense forest. Brant, the famous Mohawk chief, and his bloody warriors, had been gone several years, but traces of their pillage and murders were fresh among the early settlers in the valley and along the river. The old Dutch heroine, Mrs. Shell, was then living near Fort Dayton. She was a noted character during the revolution. Her husband being called out to fight the Tories and Indians, she took her infant to the field and helped her eldest son, a lad, to hoe the corn, with a musket strapped to her shoulder.

The savages, in more than one encounter with the Shell family, had learned to fear and respect Mrs. Shell. Her aim was steady and her bullets death. When the Indians besieged her log house, she fought side by side with her husband all day and all night, battering the guns with an axe as they thrust them through between the logs, and firing upon the assailants until help came from the fort. The house stood on the black slate hills rising near the Mohawk to the north, overlooking a long line of charming scenery. Beyond was a valley and a still higher elevation. Here the sturdy young New Englander picked his land. His strong arms felled the timber over many acres. He built his log house and established his herd upon the soil.

From such beginning sprang the mighty giant that is now stalking over the continent, dotting the land with countless herds.

From 1800 to 1826, cheese dairying had become pretty general in Herkimer county, but the herds were mostly small. So early as 1812, the largest herds, numbering about forty cows each, were those belonging to Wm. Ferris, Samuel Carpenter, Nathan Salisbury and Isaac Smith, in the northern part of the county, and they were regarded as extraordinary for their size.

About this time (1826), the business began to be planted in the adjoining counties in single dairies, here and there, and generally by persons emigrating from Herkimer county. The implements and appurtenances of the dairy were then very rude. The milking was done in open yards, and milking barns were unknown. The milk was curdled in tubs, the curd cut with a long wooden knife or broken with the hands, and pressed in log presses standing exposed to the weather. The cheeses were thin and small. They were held through the season, and in the fall when ready for market they were packed in rough casks made for the purpose, and shipped to different localities for home consumption. The leading buyers, previous to 1826, were Wm. Ferris and Robert Nesbith, from Massachusetts. Nesbith was a Quaker, and had a long face. Ferris, his partner, was of a gay and festive turn, and the fact of their partnership was not known to the dairymen. Their manner of conducting trade was unique, and very satisfactory, to themselves, at least.

First, Nesbith, the Quaker, went his rounds, visiting every dairy. Putting on a sad lugubrious cheek, he knew how to impress dairy-

men as to the inferiority of their goods, and to raise serious doubt in their minds as to whether cheese could be marketed at anything like living rates. Nesbith spoke of the difficulties of trade and the pressure of the money market. He was undecided and not exactly prepared to purchase, though sometimes in exceptional cases he was prevailed upon to buy small lots at low figures. By the time he got through his visitation the dairymen were feeling somewhat discouraged and were ardently hoping to see some other buyer. Then the festive Ferris made his appearance, and his off-hand, rushing way of doing business carried the conviction that he was a reckless operator. His prices were considerably higher than those offered by Nesbith, and the dairymen fell into the trap and sold their goods, wondering if the buyer was thoroughly posted in relation to the market.

In 1826, Henry Burrell, of Herkimer county, then a young man full of enterprise and courage, having learned something of the markets and the game played by Nesbith and Ferris, "stole a march" on these skillful operators, buying a large share of the cheese at a price above that figured by the Massachusetts firm. He afterwards became the chief dealer in dairy goods in central New York, often purchasing the entire product of cheese made in the United States. He was the first to open a cheese trade with England, commencing shipping as a venture about 1830 to 1832, at the suggestion of the late Erastus Corning, of Albany. The first shipment was about 10,000 pounds.

He was the first, also, to send cheese to Philadelphia, shipping to B. & B. Cooper in 1828, and to Jonathan Palmer in 1830 and 1832. Mr. Burrell is still in the trade, though nearly eighty years of age, and has shipped cheese abroad every year during the past fifty years, his shipments the present summer (1876) being about 1,000 boxes a week. He is among the few American dealers who have amassed a colossal fortune in the trade, and by his strict integrity and honest dealing has ever retained the confidence of dairymen.

In tracing the history of cheese dairying in other states, I find the emigration of Herkimer county dairymen often gave these new localities the first impetus to this branch of industry—thus leading the way more easily to the introduction of the factory system.

Crossing the line into Canada, we find Harvey Farrington, an old Herkimer county dairyman, in 1864-5, leading the way by building

the first factories in the Province of Ontario, and teaching the art of manufacture to our Canadian neighbors. Previous to this, the Canadians bought largely from the states. Now they produce from thirty to forty millions of pounds annually, and are our sharpest competitors in the export trade.

PROGRESS OF THE EXPORT TRADE.

In about 1848-9, or about eighteen years from the first shipment of cheese to Great Britain, our exports had increased to 15,000,000 pounds. The whole production of cheese that year in the United States was not far from 100,000,000 pounds, about 43,000,000 of which was received at the tide waters of the Hudson. British shippers that year (1848-9) were enthusiastic; drawing upon us for what was then considered an extraordinary quantity, viz.: 15,000,000 pounds, but they met with severe losses, which caused a more moderate demand the following year, and prices fell about one cent per pound, varying for fair to strictly prime, from 5c to $6\frac{1}{4}$ c for Ohio cheese, and 6c to $6\frac{3}{4}$ c for New York State. The amount exported that year (1849-50) was 12,000,000 pounds, the supply to the tide waters of the Hudson being about 42,000,000 pounds. Five-sixths of the exports were bought and shipped by the middle of January, and the remainder, say 2,000,000 pounds, was bought by two or three parties at $5\frac{3}{4}$ c to $6\frac{1}{4}$ c, which was generally thought by the trade to be too dear.

In 1851, the whole consumption of foreign cheese in England, including that from America, had increased to 48,000,000 pounds, an increase amounting to about 250 per cent. since 1831.

From 1848 to 1858, the exports of American cheese to England were not increased and they fell back in 1858 to 5,000,000 pounds; but about this time American butter began to be exported in considerable quantities. In 1859, there were about two and one-half million pounds of butter and 9,000,000 pounds of cheese exported. During the following year the butter export was 11,000,000 pounds. There was no increase in the make of American cheese during the ten years from 1850 to 1860, the census reports giving the amount in 1850 at 105,000,000 against 103,000,000 in 1860.

The quality of the great mass of butter and cheese during this decade was undoubtedly inferior as a rule.

The principles underlying the great art of manufacturing these

products were very imperfectly understood. In 1860, Samuel Perry, of New York, attempted to control the entire export product of American dairies. He sent his agents early in the season, throughout the whole dairy section of New York and Ohio, then the only two states from which cheese was exported, and they contracted for him the bulk of the farm dairies at an average price of from 8c to 10c per pound.

A large share of the cheese in those days was bought on credit, a small sum being paid during summer, but the final settlement and payment was made on the first of January. Mr. Perry, by offering a penny or so per pound more than other dealers believed the market would warrant, was enabled to secure almost the entire make of the season.

A great disaster, as is well known, followed this purchase. Much of the cheese was badly made, and it rotted on his hands and was thrown into the docks. Sales could not be made in England to cover cost. The approaching war caused troublous times, and cut off our southern trade. Financial difficulties at the opening of 1861 were frequent and pressing, and the great merchants went to the wall leaving thousands of dairymen unpaid. The lesson was a severe one to all concerned, but it was useful in this — that ever after, dairymen have been cautious in selling on long credits, while no one dealer, single-handed, has since that time attempted to control a product which from its increased magnitude is beyond the grasp of our means and resources.

Although Mr. Jesse Williams, of Rome, N. Y., had conceived the idea of the factory system, and put it in operation in 1857, it did not begin to attract attention until about 1860. Up to this date (1860), only 23 factories had been erected, but as the factory cheese was generally better made, and more uniform in shape, texture and quality, and as less labor resulted in making as well as in buying (because cheese was then bought on the shelves on personal inspection), the system began to be regarded with favor by both dealers and farmers.

Mr. Williams learned the art of cheese dairying in Herkimer. He was an original thinker, and to him are we indebted more than to any other, for the great progressive step which places American dairying to-day in the front rank among the nations of the earth. The whole frame work of the American system sprung from his

brain in one harmonious whole, and although he was fruitful in the invention of implements and appliances adapted to his work, he took out no patents, but presented the result of his labors as a gratuity to the world. The inestimable benefits that have come, and are yet to come from the original labors of Mr. Williams, can scarcely be estimated. It put American dairying upon a footing by which it could measure arms with any other branch of agriculture, and in the great state of New York it towers above all other agricultural interests combined; for if we add all the adjuncts of the dairy together; the value of pork made from whey and sour milk, the calves raised and beef and milk sold, we can hardly get the annual product from the dairy farms of New York below a hundred millions of dollars.

In 1870, the grain raised in the state was, in round numbers, as follows: Wheat, 12,000,000 bushels; rye, 2,000,000; corn, 16,000,000; oats, 35,000,000; barley, 7,000,000, and buckwheat, 3,000,000 bushels. The wool clip of the state, that year, was 10,500,000 pounds.

Now in 1870, there were nearly 136,000,000 (135,175,919) gallons of milk sold in the state, which at five cents per quart amounts to over \$27,000,000. The butter made that year in the state was, according to the United States census, 107,147,526 pounds, and this was worth that year more than \$30,000,000.

Going back to 1840, we find the value of the dairy products of New York — butter, cheese and milk — estimated (according to the United States census) at only \$10,496,000; and in all the states, at about \$34,000,000. Mark the enormous increase in thirty years, rising from \$10,000,000 to \$100,000,000.

About the years 1862-3, Alanson Slaughter, of Orange county, N. Y., conceived the idea of adapting the associated system to butter making. He arranged his factory with pools of flowing spring water for reducing the temperature of the milk, which he set in deep and narrow cans. This was the first butter factory that had been built on the continent, or indeed in the world. His plans were original and novel, and as the choicest butter was made under his system, it was the commencement of the most important improvement in butter making hitherto known in America.

The system has been carried into Sweden and Denmark, and other parts of Europe, and wherever planted, whether in the old or

in the new world, has been the means of raising the standard of butter, and promoting its consumption in a marvelous degree.

In 1862, the butter product of the United States was about 500,000,000 pounds, of which we exported about 30,000,000. To-day our annual product is estimated at from 700,000,000 to 1,000,000,000 of pounds, and we export scarcely anything. Butter factories have been carried into many states, and although the plan of setting milk has been varied in regard to deep or shallow vessels, it would have been impossible to have developed this interest to its present vast proportions, if the associated system had not been inaugurated and applied to this branch of the dairy.

It promoted an inquiry and desire for better things, and consumers, as they get a taste of the "golden appetizer," with its fine grainy texture and rosy aroma, become fond of it beyond measure, and they stimulate manufacturers to put forth their best efforts for perfection, by paying extraordinary prices for a "fancy article."

In 1863-4, the associated dairy system had become an established fact. Somehow, the impression became general among the farming community, that the dairy was reaping enormous profits.

An intense interest prevailed, not only in New York, but in Ohio, Vermont, and other states, to obtain knowledge on the subject, and this led to the inauguration of the "New York State Cheese Manufacturers' Association." A meeting was called at Rome, January 4, 1864, and the attendance was so large that it filled the largest hall in that city, delegates being present from several states.

No such enthusiastic gathering of those interested in agriculture had ever been held in this country, and people went away from the meeting with the liveliest anticipation of amassing fortunes from the dairy. That year 210 new factories were erected in the state of New York alone, and the system was carried into other states. Subsequently the association was merged into the "American Diarymen's Association," and state associations began to spring up in the different states. I need not speak of the success of these associations. Thousands of people flock to them year after year. They have created a dairy literature which, from its wide dissemination, has had a vast influence in educating the masses in this department of farming.

Contrasting the flood of light which now illumines the path of

the dairyman with the meager knowledge he possessed twenty years ago, the slough from which we have emerged seems infinitely deep and dark. By means of our associated system and our dairy conventions, the American dairy industry now leads the world, and Europe begins to copy from us. England has inaugurated our factory system, and now is about to resort to our plan of holding conventions, in order to move her people from the lethargy and stagnation into which they and her dairy interests have fallen.

At the late meeting of the Royal Agricultural Society at Birmingham, the "British Dairymen's Association" was organized, and the plan of holding conventions similar to ours will be adopted. But this is not all. It has been proposed to hold twenty-four annually at some large center—as Birmingham, for instance. A "National and International Cheese and Butter Show" for prizes, and combined with this a congress at which papers are to be read and discussions had upon them. "A National and International Congress" upon the subject of dairying in England means something more than a rambling discussion, for it will call together many of the distinguished scientists of Europe who have made long and carefully-conducted investigations concerning the different constituents of milk and their relation to the product manufactured.

Thus you will see, that what may be called a purely American movement or idea is being planted in England, and must inaugurate progress there as it has done here.

INVESTIGATORS AND THEIR CLAIMS.

In what I have said, I do not wish to attribute all the honor of our present position to American investigation or American originality. We have no scientist who can claim any range of investigation concerning milk and its products that will at all compare with those made by Dr. Voeleker of London. The "Germ Theory" belongs to Hallur and Pasteur, and nothing new in this direction can be claimed by Americans. It is true we are indebted to Prof. Caldwell, of Cornell, for first expounding this theory to American dairymen. The weight of his authority as a believer in it has had considerable influence with dairymen toward the acceptance of Pasteur's theory and applying it in some of the problems concerning milk.

Microscopical investigations to bring out results worthy of cred-

it, require the eye and the mind of the trained scientist, great patience, long experience, and a peculiar aptitude for the work. It is one thing to look through a microscope, but quite another thing to be able to designate correctly what one sees. Hence the observation of the mere tyro must be taken with due caution.

Our best cheese as now made is, in all its essential principles, the same as that originated in Somersetshire, and which has been in practice for more than a hundred years at the foot of the Mendiss Hills. All theories in vogue from time to time diverging from their principles have ultimately proved failures.

You will say that we have been improving the character of American cheese for the last ten years or more, or that it never suited the English market so well as now. I grant it, but it is because we have come nearer and nearer the true "chedder method" which was first made known to our dairymen at their convention in 1865. I do not now refer to appliances for abridging labor—then of course an original American invention, but I have yet to be shown a single original scientific principle that has been discovered and adopted by which our cheese manufacture has been improved above the old chedder method.

The lesson which our dairymen are learning to-day is, that there is a difference between speculative theories and sound practice. We have learned the reason for many dairy operations and these have been so well expounded from time to time that our cheese makers have become better grounded in the science of the dairy, and are more intelligent than the great mass of practical dairymen in Europe.

But there are some things concerning the care and preservation of milk that may be placed to our credit. The cooling and aeration of milk for its better flavor and condition is ours. Mr. Foster, of Oneida, N. Y., was the first to discover that the odor of putrifying animal matter, like that of a dead horse, may taint the milk in the bag by being breathed by the cow while at pasture. The microscopical investigations of Prof. Law, of Cornell, were the first to show how vegetable organisms may be transmitted to the milk from the water which cows drink to slake thirst. Mr. Truman, of Chenango county, was the first to discover that other fat than obtained from the milk may be substituted for it in cheese. The late Gail Borden, of White Plains, N. Y., was the first to show how

milk may be successfully eliminated of its water or condensed. He was an original thinker and investigator, whose name, next to Jesse Williams, will go down to posterity as the inventor of the grandest improvements in connection with the dairy known in any age of the world. The preservation of milk in all its integrity for long periods, before Mr. Borden's time, had been attempted, but without success, and eminent chemists and scientists had pronounced the condensing of milk, with its cream unseparated, an impossibility. Mr. Borden persevered, inventing elaborate and complicated machinery, entirely original, for the purpose, and at last his efforts were crowned with success. Thousands of our soldiers during the rebellion — thousands upon shipboard — in cities and upon the plains — have called down blessings upon this man for the benefaction of securing to them the luxury of pure milk — milk which otherwise could not be had. If the lives of children saved in our cities by the use of Borden's condensed milk be taken into account, we shall scarcely be able to estimate the value of his labors. His inventions and processes have been carried into Europe, and he is recognized in history to-day as one who has done an important service for humanity.

Mr. Slaughter, of Orange county, was the first to adopt the associated system of butter making, and to apply the deep setting of milk in cold water for getting the cream. This was an important step toward progress. The Swedes and Danes were the first among European nations to copy the American idea of butter factories and the setting of milk in cold water; but Sweden, with her scientists under royal patronage, was not content simply to copy, and to Sweden belongs the credit of first demonstrating that cream will rise rapidly and perfectly when the milk is reduced to near the freezing point in ice water.

This principle has been a surprise to the butter dairymen of America, and is another step in the progress of butter dairying.

Mr. Hardin, of Kentucky, is entitled to credit for a modification of this system, in which the air is cooled in refrigerator boxes, which are used for setting the milk, and he claims as an improvement the covering of the milk and the exclusion of the air while the cream is rising. There can be no doubt but the cold theory is the true one for making butter. It arrests decomposition from the start, and the fine quality of butter made by this plan is positive proof of its merit.

The heating of milk and then cooling it to obtain the cream, together with the manufacture of the skimmed milk into cheese, is of ancient origin. It had been practiced in Devonshire, England, for more than a century, and hence no claim can be made of its being an American idea. The English experimenters, years ago, pronounced it inferior to other methods then in common use, both as to quantity and quality of product.

In closing the claims of American inventors, I must add two more names to the list, that of Dr. Sturtevant, of Massachusetts, who has made some original investigations in regard to the milk globules of cows of different breeds, while Dr. H. A. Mott, of New York city, has recently made some very interesting discoveries in comparing the milk of different races. His analyses show that the milk of the black race contains more milk solids than that of the Caucasian, particularly in milk, sugar, fat, and inorganic salts. The same rule also applies to brunettes, and it becomes an interesting question whether the color of animals is any indication as to the quality of milk yielded.

CONCLUSION.

In conclusion, a word may be offered in regard to the present status of American dairying. Commissioner Wells, in his celebrated report upon the "Industry, Trade and Commerce of the United States," for 1869, puts the value of the products from the dairy in the United States at \$400,000,000 per annum. If that be correct for 1869, the annual product from dairy farms to-day must be at least \$600,000,000. The New York Butter and Cheese Exchange estimates the annual butter crop at 1,400,000,000 pounds, which at thirty cents per pound would alone amount to \$420,000,000. In my opinion, the Butter and Cheese Exchange has estimated the butter product too high, but it must not be far from 700,000,000 pounds per annum. But when I say that the actual product from the dairy farms of the United States amounts to \$600,000,000, it may not strike you with its full force. This amount will be better appreciated, perhaps, by a comparison. In 1860, the total industrial product arising from agriculture in the United States was estimated at about \$1,800,000,000; so that the dairy farms of the United States to-day produce a sum equal to one-third of the value of the entire production of agriculture, in all its branches, in 1860.

It must be evident, therefore, that the dairy is second in importance to no special agricultural industry of the nation.

The associated dairy system now stretches in an almost unbroken line from the Atlantic to the Pacific; commencing in Maine it sweeps over New England, then throughout the Middle States it is the most important industry. Its foot is firmly planted in the West and Northwest. Crossing the Mississippi, it has pushed its way into Kansas, Colorado and Nebraska; even at North Platte, on the very verge of the rainless region, I last year found a prosperous cheese factory and large herds, owned by the accomplished widow of the late Post Master General Randall, associated with Hon. Mr. Webster and his son. Along the base of the Rocky Mountains and in the canyons and parks of that wonderful region, I have been surprised to find numerous herds and large dairies. In Lake Valley, on the shores of Lake Tahoe—one of the loveliest spots to be found in the Sierras—there are no less than thirteen dairies of 150 cows each, on a tract eight miles wide by fifteen long. Here butter is made which commands a ready sale in Carson and Virginia City at 50 cents and upward per pound. The Mormons are developing the business at Utah, and already they have factories and co-operative dairies. Then in California, as you know, all along the coast range, dairies have been planted. Even so long ago as 1870, I found here the largest dairy farm I had ever seen—the dairy ranch of the Shafter Brothers, embracing 75,000 acres, and having over 400 miles of fencing. There were upon it 3,000 cows in milk, and I rode more than 100 miles on private roads as smooth and as free from ruts as any in the old dairy districts of New York. This ranch has since that time been divided into three 25,000 acre dairy farms, each of which in turn is portioned out into dairies numbering 150 cows and where the choicest butter is made for the California market. The climate here is admirably adapted to butter making, the temperature, winter and summer, never varying much from 60 degrees Fahrenheit.

The annual cheese product of the United States now averages a little under 300,000,000 pounds, of which we export nearly 100,000,000 pounds—92,000,950 pounds in 1875. The receipts in New York during 1875 were 2,322,015 boxes, against 2,046,575 boxes in 1874 and 2,007,633 boxes in 1873. In round numbers the receipts in New York during 1875 were about 130,000,000 pounds. The

exports of butter from New York in 1875 were only 4,226,976 pounds.

MARKETING.

One great feature belonging to the dairy, and which gives dairy-men an immense advantage over other farmers is, an organized system of marketing. The system was commenced at Little Falls, N. Y., in 1860-1—buyers and sellers meeting on certain days of the week in the open street to make transactions; for the business was then transacted in the open air by the side of the wagons. Attempts have been made by certain parties to falsify the truth of history by representing that the first efforts to establish “sale days,” or a country cheese market were made at Utica in 1870. There is scarcely a dairyman in Central New York but is familiar with the fact that Little Falls had a regular weekly dairy market 10 years prior to 1871, when millions of pounds of cheese were sold annually, and that there were no regular sale days at Utica until 1871. On some market days at Little Falls previous to 1864 several hundred farmers have been in the streets near the railway depot, each with his wagon loaded with cheese, boxed and marked with his name, while some twenty or more buyers were scattered among them and passing from wagon to wagon—some from New York, Philadelphia, Boston, Baltimore and other cities with an occasional shipper from England could be seen examining boxes, tasting, smelling and making bids for the loads. In 1864, the first weekly reports of the Little Falls market, then and now the largest interior dairy market in the world, began to be made. Previous to 1864, farmers relied on city quotations, which were sometimes thought to be in the merchant’s favor. But it was not until the early part of 1871 that a Dairy Board of Trade was organized, though the project was agitated in 1869 by residents of Little Falls. Here, as in the origin of the dairy movement, Herkimer county took the initiative, establishing a Dairyman’s Board of Trade, under the general name of the “New York State Dairymen’s Association and Board of Trade.” Soon after publishing and sending out circulars giving the plan of the organization and the rules by which it was to be governed, the dairymen of Oneida took copy and also established a “Dairyman’s Board of Trade” at Utica. The plan spread to other sections and now many dairy centers in New York and in other states have their Dairy Boards of Trade at which merchants and

sellers meet on regular market days for the transaction of business in dairy goods. The telegraph is here brought into requisition, and sellers go upon the market knowing something of the demand and the price on both sides of the Atlantic. At the interior markets competition often runs high, and merchants sometimes complain that margins are narrow, and money not so easily made as when the goods were bought at the factory on city quotations. Be this as it may, the dairymen now have a sort of commercial education. They study the markets, home and foreign, and they judge when it is best to realize on their goods.

SHRINKAGE IN VALUES FOR 1876.

The shrinkage in values on nearly all kinds of property during 1876 has been very considerable. Real estate has depreciated from 25 to 30 per cent. The fall in cotton goods and some other manufactures has been very great. The value of nearly all our agricultural products is below the range of 1874, and it is not surprising under the pressure of the times, that dairy goods should have been comparatively low. But even under the darkest phase of the times the outlook of dairying is by no means discouraging. Indeed, there is no class of farmers better off to-day than the dairymen. They have sold their goods from month to month and from week to week for cash, and their goods have found a ready market without pushing, while other products have been dull and slow of sale even at greatly reduced rates. The European demand has been fully equal to our surplus, and exports keep values upon a gold basis. It is true prices have been low, but not nearly so low as they were years ago, when dairymen found it not difficult to amass fortunes in the business.

The one hopeful sign for our increased production is, that English production is decreasing while the increase of population in our cities and towns calls more and more for additional supplies of fresh milk and an increased quantity of butter and cheese for home consumption. That we are not over-producing is proved by the free disposal of the entire products of the dairy from year to year. Very likely if the make were less, prices would advance, but the values realized on account of scarcity press heavily upon the masses, who for the most part find it hard to make the ends meet from year to year. It is better that the people have cheap food with moder-

ate gains to the producer, than that they should suffer for want of food, that the producer may grow suddenly rich.

Many dairymen of late years have neglected the economies of dairying, and it is the waste and extravagance that pinches harder than the low prices. He who can cut off waste and be content with moderate gains, will see a silver lining to the cloud, if indeed there be a cloud that dims the future in the far distant horizon. The merchants of the dairy at home and abroad are men who do honor to trade, and among them will be found those who would sooner lop off an arm than stoop to a mean action. The commercial integrity of the dairy stands unsullied, and this is an element which helps to place American dairying upon a substantial footing.

VEGETABLE AND FLORAL GARDENS.

BY MRS. D. HUNTLEY, APPLETON.

Read before The Farmers' Industrial Association in Appleton, April, 1877.

THE FLORAL AND VEGETABLE GARDENS

Are both indispensable to a well arranged and properly adorned farmers' home. Their size and arrangement should depend much upon the amount of help on the farm and the time that can reasonably be devoted to their culture, but on no account should the field crop, or the hurry of any other work, cause the total neglect of either flowers or vegetables. There may not be time for any elaborate arrangements of walks, or beds, or of ornamental modes of culture, but the varieties may be grown and if well cared for will be both pleasing and useful. If either of these gardens which add so much comfort to the household must take precedence, it should be the vegetable. The physical wants must first be provided for or there will be none to admire the ornamental. The vegetable garden should be near the kitchen door, where it can be seen and enjoyed by every member of the family from grandfather down to the youngest children. A little skill in the arrangement will make it very attractive. There is a good deal of real pleasure in watching the growth of thrifty plants. We have sometimes fancied this

feeling was reciprocal, for certainly the garden that is visited oft-
enest, and admired most will grow the fastest, no matter for what
reason.

In the vegetable garden there should be a succession of eatables
that will give a handsome variety for the table the whole year.
Beginning with lettuce and radishes, there must be no day that the
garden does not contribute something for the table that is relisha-
ble and attractive. Peas, beans, and corn follow each other in quick
succession for summer use; then the old-fashioned kinds, such as
cabbages, beets and onions are always in order and should be put
by for winter, especially the latter which though tabooed in society,
is the most healthful of all vegetables and does not become stale
and insipid in spring. The nicer varieties, such as celery, egg
plant, tomatoes, and salsify, are not only desirable but positively
essential; particularly the last two. Salsify or vegetable oyster, is
good at any time after it is of sufficient size, and, if taken up in the
fall and put in boxes of earth in the cellar, is excellent for winter
use and will keep in good condition till spring, when those left in
the garden will be found decayed. The tomato is one of the most
useful of all the garden products. We are not at all partial to its
peculiar flavor, but, as a housekeeper, we have learned to prize it
very highly. It is good cooked either green or ripe, is excellent
for either sweet or sour pickles, for preserves, for catsup, and for
canning. It is doubtful if even that most useful of all fruits, the
apple, can be prepared for food in so many ways as the tomato.
Any family with one square rod of ground planted to tomatoes
well cultivated, may have a supply of this fruit in its season and
enough for pickles, preserves, and for canning, to last from autumn
till summer. All the varieties are very handsome; the scarlet,
white, crimson and yellow give a pleasing contrast in the fruit bas-
ket, but the "Trophy" we think best for general use, and the small
yellow best for preserving.

An ample supply of all the products of the garden well put up
for winter will save the housekeeper much perplexity concerning
her table, and go far to silence the complaint "nothing to eat,"
which is about as disagreeable as the cry of "nothing to wear."
Besides, "it is a secret, we are told that farmers' wives with ample
gardens seldom fret, and never scold."

Flower gardens in the country are the exception, not the rule.

Very few farmers have the time, taste, and skill requisite to overcome the difficulties attending floriculture on a farm. For this reason, it is not practical for the average farmer or his family to attempt to cultivate a garden exclusively devoted to flowers. But around every farm house there should be, and can be, a well kept door yard, with a handsome lawn, with trees and shrubs, and a few flowers. This can be so arranged as to require but little care, and yet add a great deal of beauty and pleasure to the home. In the first place, prepare the lawn so that you will have a carpet of green grass before the door. This is the thing indispensable. Then, if the yard is small, a few trees and shrubbery, such as you like best, set in remote parts of the yard. Then place what flowers you do have very near the house. You can take care of a small flower bed while you would be going back and forth to the middle of the lawn. A very pretty way is to make a narrow bed two feet or 18 inches wide at the side of the house, or all around it if you have the time to care for so many flowers; then arrange varieties according to their habits and your taste. Dahlias will grow best under the drip of the eaves, and the dwelling will afford protection from the winds. Pansies will do best at the north or east side in partial shade, while verbenas should be in the sunshine on the south. Among these should be others more delicate, that will give a pretty contrast in colors, and always remember you cannot have too many white flowers. Then there should be a vine for the window or door, for a basket or trellis, and when all is completed your house will appear as though set in a frame work of flowers. If you can do more than this, a well kept bed of annuals in the center of the lawn is very handsome, but a large vase or lawn basket is quite as ornamental, and very much easier kept in good condition. If the dooryard is small, a narrow bed all around the yard next to the fence has a very pleasing effect, but most of the door-yards in the country are not enclosed except on the road, and shrubbery or trees or the termination of the lawn marks its boundary, in which case flowers give most satisfaction near the house, if time is limited.

The best way to plant seeds we have found to be in a box of earth near the door or window, and when the plants are two or three inches high transplant where you wish them to grow. A few kinds planted with the vegetables will beguile one into their culture, yet take little time from necessary work and give much beauty

and pleasure in return. We all remember the poppies and the marigolds of the olden time, that were kept growing among the beets and onions, we can think how their bright colors would glow in the sunshine on a summer morning. They are just as showy now, gleaming through the green foliage, as flowers of later fashion. We still love to see them in the garden. They are the dear old friends that we have sweet memories of childhood. But we have something more than these. That most charming of all our newer annuals, the Verbena, is admirably adapted to the Spring garden. It needs rich soil, good culture, and much sunshine, and will beautify any spot where it grows. This one variety will give so much satisfaction you will be likely to add others. Flowers are social things. One rarely sees a beautiful plant growing where the inclination is not to give it company, and if you collect new varieties till your door-yard assumes the dimensions of a flower garden, so much the better; your enjoyment will be in proportion, and you will never miss the time given to its care.

MERINOS FOR MUTTON—A LOOK AHEAD FOR FINE WOOL SHEEP BREEDERS.

BY HON. A. M. GARLAND.

Read at the recent Sheep-show at Waukesha, Wisconsin.

With each recurring springtime, the eyes of western flock owners turn toward southeastern Wisconsin, while they, in body or spirit, mingle with her breeders in their annual reunions around the festive board and on the well filled shearing floor. Your good judgment, hard work and skillful breeding have combined to give Wisconsin flocks an enviable reputation among the strivers after a higher type of American merino in all parts of the country. However much I enjoy the privilege of once more meeting with you, noting the improvement in your flocks, and sharing in the justifiable pride with which you can point to the achievements of the past, it is with somewhat of "fear and trembling" that I attempt the role of entertainer for even a short time. What is there in the past history, the present attainments, or the future possibilities of an ad-

vanced live stock husbandry, that the sheep breeders of the United States have not heard and realized, and dreamed upon? Gladly do I come as a learner among those so able to teach. As a teacher there is no encouragement for me; and it is the prompting of the hope that the direction I may give to discussion will bring forth the results of experience broader and riper than my own, coupled with counsel that is begotten of conviction, rather than that any idea I may advance may be new or useful to you, that secures my consent to occupy any part of your time.

Long centuries ago, even before history began to record the march of events, the sheep had a home in western Asia, and was recognized as the principal source of primeval wealth. Its skin clothed, and its flesh nourished the bodies of patriarchs and peoples before the quiet of the world was disturbed by whirring spindles and murmuring wheels. The coincidence seems fitting that the most important contributor to our physical wants should come to us from the land also honored as the birthplace and cradle of that greater blessing, which ministers to our spiritual needs. Gradually have the two widened their field of recognition, until it is reserved for the closing quarter of the nineteenth century to present a consummation of the highest achievement of civil and religious liberty, and the best results of agronomic skill, still side by side on the old continent and the new; the one insuring comfort and plenty for the present, the other whispering of happiness and peace hereafter.

But this practical age will not patiently stand studying the past of sheep husbandry. At this time we need to review that past only so far as its experiences may prove advantageous in working out the higher destiny that is before us. He who stands gazing upon the temples others have built, will be jostled by the throng that press on to the accomplishment of the work that is allotted to them.

As my remarks are directed so exclusively to merino, I shall confine myself principally to the consideration of the sheep in which they are interested; at the same time disclaiming any desire to disparage the recognized merits of the long and middle wools — which I could not do if I would. The value of the Cotswold, the Leicester and the “Downs” recognized on both sides of the ocean, is quite too deeply emphasized to suffer by comparison, even though overdrawn — (which I shall endeavor to avoid); or pointed with pre-

judices — (of which I have none). Let no unfair word be said of the so-called mutton breeds. They have their place in the world's economy — and right well do they fill it.

But as breeders of American merinos, you are justified in taking what might, under the circumstances, be deemed a somewhat selfish view, and inquire how most nearly to meet *all* the requirements of the future, by developing existing merits of your flocks, and, if may be, by adding new ones.

Though so much has been accomplished in the way of improvement since the importations from Spain, no one can claim that the limit has been reached. The road to improvement in the future is as broad as it has been during the past.

The first demand of humanity is for something to eat; the second, for something to wear. The first knows no exception; the second, very few exceptions, and these confined to the rudest people inhabiting the mildest climates. Thus the paramount consideration with the economist who studies the interests of a great and growing nation, is how best and most economically to feed the masses. A well fed people are usually an easily governed people; while hunger and want bring in their train defiance of law and invasion of the rights of property. Those who have devoted most attention to the subject have long since recognized sheep as an important factor in the meat supply of the more advanced nations. Mutton comes within reach of the poor man's means, while money can buy nothing better for the rich man's table. The facts of its cheapness, and the habit of its use, are taking hold upon our people, as they already have upon those of Europe, and will go and grow with the children of the present as they dot our frontier with new homes, and add the results of their labor to the monuments of progress that mark the march of empire. As practical men it is for you to meet the questions: How is this taste for mutton to be fostered? and how is the demand which it will create to be supplied? To the first I reply: By placing within reach of every family choice mutton, at a price suited to the purse of the poorest; and to the second, I reply, *make the merino sheep produce the flesh to feed the million*, as well as the wool to clothe the million.

Those who have studied the results of the past fifty years, need not be told that this can be done. There is nothing wanting but a recognition of the necessity for action, and a preconcerted determination that the object shall be accomplished.

After long and careful study, I am forced to the conclusion that the prevalent idea of the superiority of the flesh of the so-called mutton breeds, considered aside from artificial influences, has in it more of sentiment than reality. *Naturally*, the flesh of the Merino is as sweet and nutritious as that of any sheep. England has done much for the live stock interests of this country. The care and skill and industry of her breeders furnish examples worthy of emulation, as do her cattle and swine afford models for imitation. The humid climate of England, as well as the necessities of her agriculture, is peculiarly conducive to the growth and perfection of coarse and combing wools; hence the efforts of her breeders have been directed to the cultivation of those wools, and the development of the meat-producing characteristics of the animals bearing them. This fact, coupled with the proverbial, and largely excusable, home pride of the Englishman, is to be credited with much of the alleged superiority of flesh of the larger breeds. The careful feeding bestowed upon these, with a view of imparting flavor and nutritiousness to the flesh, if applied to the Merino, would, in a few generations, produce meat fit for the palate of a king, or the sovereigns of our own land.

A quite pertinent query in this connection is, Can the large breeds be safely depended upon to supply the increasing demand for mutton? They are commonly recognized as the most prolific; but when we look around us for results, the fact is palpable that, with the incentives of an enhanced price for combing wools, a steadily paying demand for breeding animals, and a fair price for meat, for twelve years, there is no such increase apparent in the numbers of long wool sheep as it seems should have resulted from the intelligent effort of those breeders making the culture of such stock a specialty. This fact, in connection with the further one, that a very large proportion of the young animals of both sexes have been used for breeding purposes, presents a problem that as yet has found no satisfactory solution, though well worthy the attention of practical breeders.

The most serious objection to the American Merino, as a meat producing animal, is its size. The theory that the breeder's aim should be to produce an animal that will yield the greatest weight of wool in proportion to weight of carcass is inconsistent with the interests and aspirations of the owners of the large pastures and

fertile grain fields of these great valley states. Whatever force it may have when applied to the cramped agriculture of New England (and even then I deem it a mistake) is lost with the fading view of her rocky hills. The western farmer, inspired by the expansiveness of his surroundings, feeds with an unsparing hand, and is satisfied with nothing short of grand results. The long wool sheep commend themselves to him because of their size and rotundity; and when the Merinos are bred to the point of development of carcass that lies within the range of practical achievements, the only obstacle to their general popularity will have been removed.

When the Merino ewes, in fair condition, kick the beam at 100 to 120 pounds, and full grown wethers yield the butcher 20 to 25 pounds per quarter of dressed meat, the term "mutton breeds" will lose its significance, and little will be heard of the superiority of those animals to which it is now applied. My faith in the intelligence and industry of Merino sheep breeders is such as to warrant the prediction that they will be found equal to all the demands of the future, as they have been to meet the necessities, and even whims of the past. Such size and contour will be given their stock as to place it at no disadvantage when meeting its long wool cousins in the markets of the country. Let this be done, not to displace a single long or medium wool sheep from our farming economy; but rather to help all breeds to a more satisfactory future, by creating where it does not now exist, and fostering, where created, a broader and better market for their flesh — so important an item in the yield of profits.

Increased size and improved outline must, however, be secured without sacrifice of shearing qualities, unless the magnificent merino fleeces remain as dense, as fine, as even, and cover all parts of the body as completely as they are found on the best animals of to-day, any improvement of carcass will have been too dearly bought. The merino of the future will be, like its ancestry, the main source of the supply for the material that clothes the great mass of the people, and a heavier fleece, covering a larger carcass, must be found among its facilities for meeting the constantly augmenting demand.

Admitting the necessity for increased carcass, and the possibility of securing it without offsetting sacrifices, the one important question that remains is, How can it be accomplished? The answer is, by *judicious breeding* and *liberal feeding*. Neither of these will

secure it alone. Combine the two, and leave the results to time, and the coming decade will be signalized by an advancement in the standard of ovine excellence, rivaling that of any similar period in the past.

I have always advocated liberal — in fact, what is usually termed high feeding — and still have faith in its efficacy, when freed from such surroundings as degrade it into mere pampering. Sheep will live in comparative neglect; catch an existence from what most other animals would overlook, and thus bring to the thriftless farmer better returns than he merits, from the neglected herbage and waste places that advertise his slovenly husbandry to the world. But the highest development need not be expected under such conditions, until a reversal of nature's laws allows man to "gather roses from thorns and figs from thistles." The fiat that condemned man to toil as the price of his bread, still has him under its ban — and contrive however he may, the rule that something shall not be had for nothing still holds good. The sheep — favored animal of sacred history, which so frequently cites its meekness, innocence and usefulness in illustrating the standard of a more perfect humanity — while obeying more nearly than does the average man the Divine injunction, by returning good for evil, is nevertheless, readily marked by the scars that follow neglect and maltreatment. It will, however, repay in ample fold for liberal feed and enlightened attention to its comparatively few wants. Experience teaches us that upon alimentation during the first year of the life of the lamb largely depends its final development. Abundance of bone and muscle producing food, given at regular intervals, and with ample opportunity for exercise, can be depended upon for satisfactory results, in developing a physique susceptible to modification, and capable of increase within reasonable limits.

The breeder who succeeds must be a student as well as a liberal provider. Mere haphazard will bring the disappointment its follower deserves. The patient and far-seeing efforts of Bakewell and Ellman in England, and the enlightened perseverance of Atwood and Hammond, and a long list of honored preceding and contemporary breeders in the United States, must be studied and emulated, and their methods adopted, with such modifications as may be needed to bring results up to the exacting demands of a necessarily modified sheep husbandry.

Let me not be misunderstood. I would draw the line broad, and deep, and enduring, between a proper system of liberal feeding and all attempts at abnormal development, commonly known as pampering. The one brings size, and vigor, and beauty, and insures their transmission with reasonable certainty; the other induces disease and imbecility, and ends in disappointment to the breeder, or a swindle upon the purchaser. The one is worthy the attention and experiment of the highminded breeders who are the dependence of our future progress; the other has in it no utility that will compensate for the encouragement to deception that seems inseparable from its practice.

I would have sheep breeders attain the highest possibilities and consequent profit of their calling, by escaping such mistakes and experiments as entail loss of time and money — that they may be enabled to transmit the talent committed to their care with such improvements as to warrant the plaudit of “well done.” I would have the result of their labors to be such as to cause the grass to grow green beneath the feet, and the skies to seem bright over the heads of some men, so that when life’s shadows have grown long, they may find consolation in the fact that the world is better for their having lived in it.

EDUCATION OF FARMERS’ SONS AND DAUGHTERS.

BY ALBERT E. WOOD.

Read before the Concord, Mas., Farmers’ Club.

It seems to me this is a subject coming directly home to us all. With the younger members of the Club it is a question of to-day. *How* shall we educate our children? The older members have, fresh upon their minds, an experience from which they can draw words of wisdom for our benefit.

I wish to say a few words to you to-night, looking back upon my own school days—looking all along through twenty-five years of life out of school, and looking anxiously at the *present* and forward to the *future education of my children*. I have always felt that a mistake was being made somewhere; that the farmers’ sons, and

the farmers' daughters *too*, were not receiving the education which farmers' sons and farmers' daughters should. I mean that they are not receiving the *kind* of education that they should to become farmers and farmers' wives.

I feel that they are not receiving the education which best fits them for success pecuniarily, and more particularly are they not receiving that education in our schools which fits them to become contented and happy farmers; that education which will make them willing to *stay upon the farm at all*. Allow me to ask, and to answer in my own way. Who is the farmer? He is a servant of Nature. All that he does is to assist her in carrying out her great laws. In planting the seed, in carefully tending the growing crops, and in gathering the harvest, he must bow to her dictates. If the seed is not planted at the right time, or in the right manner, or in the right place, or the growing plant is not rightly tended and fed, or the harvest is not properly gathered, then he meets with failure. Upon the doing of all these things right, and with a will, will depend his success. The question now stands before us, How is the farmer to be educated to do this, or what education can he receive that will, in any way, help him do it? Beyond the common school education, what is the farmer to study to fit him best to do all these things understandingly, and, at the same time, in a way to secure pleasure from them.

A farmer with almost no education at all, except so far as he has gathered it himself during an active business life, can pass along respectably, and as a farmer, successfully, perhaps, and if he is satisfied with this, I have nothing to say. The question to-night is, How shall we educate our children? and I take this to mean something more than the mere elements of an education, necessary to any one, whatever position in life he occupies. My answer to the question is, that our sons should be fitted to study *Nature*; her book is spread out wide before them. The farmer's interest, as well as much of his happiness, is in the study of it, and yet how few of us are able to read one word from this great book. This seems to me to be the point where the farmer's education comes short. We are not educated to the reading of this great open book of Nature. It seems to me there is a success with the farmer, beyond the dollar received for his crops. With most of us the dollar is the first, and perhaps the most important consideration, inasmuch as our

daily bread depends upon it. Yet it seems to me I can see something beyond and higher than this, that should come particularly into our minds in this discussion. We pride ourselves as being above the brutes, in that we are capable of higher intellectual attainments. If we bury these talents in the earth, how much better are we than they?

Farming is hardly a money making business, and if we cannot in some way make it pleasant, we can have but little hope of persuading our sons to follow it. The farmer's work is hard, but if, while planting the seed, or tending the growing crops, we can, with an appreciative eye, watch the seed start into new life and beauty, can we not the better bear the hard work? If we can see the wonderful growth going on all around us, and while doing so, can catch but a glimpse of the working of the great laws by which it is governed, are we not the better paid for our labor? If, with an educated eye, we can see the great beauty all around us in landscape or flower garden, or can feel God's majesty in the thunder cloud, if we are educated to do all this, then is there not something for the farmer worth having and working for, besides the dollar that feeds and clothes him?

How shall we educate our children? First, I would have the farmers' sons, in common with all other sons, have enough of mathematics to meet all the requirements of business, grammar enough to talk and write correctly, and geography enough to understand what is going on in the world around him. I would have a great deal of attention paid to reading and spelling, much more than is now devoted to it. As it is the first thing when entering school, I would have it the last when leaving. Beyond these studies, common and necessary to all, I would have the young farmer prepare to study and understand nature. In school, only the beginning of this can be attained, but a start can be given and a love acquired — a seed planted that will grow and bear fruit in mature life. I would have enough of chemistry mastered to enable the man, when placed in active life, to read and understand any article he may meet on this science. Entomology enough to enable him to tell his enemies from his friends in the insect world. Physiology enough to know what is best for his own physical well being, as well as for the animals placed under his care. Botany enough to — well, I would have him know all there is to know in it. Who, more than

the farmer, needs this? I would have him familiar with all the natural sciences. As it is now with most of us, if, in our general reading, we chance to stumble upon an article that requires a knowledge of chemistry to read it understandingly, we skip it and go on to the next. A book with the title of botany, vegetable physiology, agricultural chemistry, entomology, zoology, we shun as we would Greek, as something we are not educated to understand. Now, I would have the farmer educated to the point of reading and understanding all these books. If the foundation is not started at school, if the tender twig is not inclined in this direction, but is forced to grow in another, then it will be hard to change its course in mature life.

And now a word as to our schools as they now are. I think there is a growing feeling among the farmers, that the studies in the high school are not arranged quite to meet the wants of the farmers' boys. There is a feeling that our schools are managed with a view, more especially, to fit boys for college. That is, if you go beyond a certain point, all the studies are in that direction. Now, the study of French, and Latin, and Greek, and of the higher mathematics, is of the greatest importance to a student training himself mentally for a minister or a lawyer. Yes, I believe that just so far as we give our sons this peculiar training, just so far we unfit them for farmers. A fond father, perhaps, seeing the great benefit to be derived from an education which was, in early life, denied him, resolves to do better by his son. The boy passes through the studies taught in the district school and gets admitted to the high; he spends two or three years in this school and stands high in his class. How proud the father feels at the examination to hear his bright son read French and Latin, or what to him is mere jargon, algebra or geometry! The boy graduates with honor and goes back upon the farm to work; with what satisfaction the father feels that now his son is prepared to settle down upon the farm contented and happy; that his fine education will help him to make all the crooked things in farming straight, that he will help and advise him, and be a support to him in his declining years. Let me ask how many such anticipations are to-day realized?

In days past, when but few received any more than just enough schooling to be able to write a poor letter, or to calculate interest upon a note, this course of study was the right one—the few who

went beyond this course, preparing themselves for teachers, or for the professions; but now, things are changed; an education is demanded by all classes, and that education should be of a kind to be useful in active life to the one who receives it. There should be a point in our schools where those fitting themselves for farmers or mechanics could switch off and go upon a different track from those preparing themselves for a more liberal education.

It is the duty of the farmer to see that he gives his son a good education in the direction that I have described, without spending too much time upon studies which unfit him rather than prepare him for the active life before him as a farmer. Give him studies that, while they help him on in his callings, will, at the same time, make that calling a pleasure to him. It seems to me this can only be found for the farmer in the study of the natural sciences.

One word upon the education of our daughters. I think the more the subject is agitated, the more we, both the fathers and the mothers, feel the importance of giving our daughters a pure, home training. I am old fashioned enough to believe that the sphere of woman is in the home circle, and *that* education which best fits her as *wife* and *mother* to make home what it should be, is the one for us to give her. If we have the means, and our daughter the taste, let us hold back from her no desirable accomplishment. But, meanwhile, bear in mind that all these things are but secondary to the one great point of fitting her to fill, with pride and satisfaction, the great station appointed of God for her, as the presiding spirit of the domestic circle.

“GIVE AND TAKE.”

BY HOWARD GLYNDON.

Something for something—not something for nothing—is the great truth upon which the universe hinges, and has hinged since ever the morning stars sang together in grand concourse, praising God who had made them. He gave them being; they gave Him praise. And for the man who does not acknowledge this law it would have been better that he had never been born.

The rain falls upon the earth and it bursts into leafage. The sun shines upon it and it laughs back at him in all the beauty of a million flowers. The mountains tower up toward the blue sky, and the sky bends down to meet them. The shore slopes to the water and the water presses up to the shore. The moon and stars look upon the sea and it flashes back their radiance. Everywhere it is the old story of Steel and Flint. Throughout all nature this lesson is so plainly written that he who runs may read—may read as he runs without ever stopping to spell out the words, or to puzzle over their meaning—something for something.

The exceptions to the general rule render the rule itself still more striking. In all the world of nature there is nothing so worthless as the parasite—nothing so forlorn as the blasted tree. The first feeds on the life of its supporter, its benefactor, its friend; takes all and gives back nothing. By common consent it has been made synonymous with the meanest specimens of living beings that have human existence.

What worse name can you call a man after you have called him a parasite?—since that very state of being breeds upon occasion in him all the other vices. And then, the blasted tree,—it is the type of a human being unresponsive to all influences for good. He might better be dead; for upon him do all the kindly agencies of mercy exhaust themselves in vain.

He stands as the blighted tree stands. On it the rain falls and the sun shines; it gives back nothing; it is good for nothing but to fall and rot and become as leaf-mould—an enricher of the soil. In this, its last state, it is better than when it stood upright but useless.

The carcass of an idle preyer upon the substance of others can fill no better part if he remain obstinately shut up in himself. The sooner he falls and rots and his place knows him no more, the better for the world. He will then at least be the equivalent of the dead tree in usefulness—he will help to enrich the soil! It is better that such should not cumber the ground. Let others who are amenable to the great natural law of give and take, step into their places.

The lack of an instinctive appreciation of this law causes many failures in life. There are people stupid enough to start out with the idea of getting all they can out of others and of giving nothing

in return. Theirs is the sharpness of the half-fool. Cent-per-cent. rules in the busy world; favor for favor with politicians; love for love in the kingdom of the heart. Everywhere, as in the world of nature, it is give and take—something for something. Even in the relative positions of benefactor and benefited, within reasonable limits, the pleasures of giving and receiving are reciprocal and pay each for the other.

But it becomes at last wearisome to do for a person who is always asking to be done for and who never does anything in return; is hardly thankful indeed, but takes your best efforts as a matter of course almost. The chief delight of generosity to the donor lies in its being involuntary. But chronic mendicancy of any sort weighs on the elasticity of this spring. The chief charm of a suppliant is gratitude; shorn of that, he is but a brazen beggar at best. Perhaps the most loathsome, but at the same time the most expressive synonym to the parasitic tendency, is the Horseleech's daughter, with her cry of "Give! give!"

We all recognize instinctively the bitter discouragement that comes from showering gifts upon a barren, unresponsive soil—that is to say, upon a selfish, grasping person.

No matter how cleverly sharp such a one may be, the world finds him out in the end and leaves him to himself—gets tired of putting its hands into its pockets for one who never put his near his own, excepting to deposit something therein and button them safely up immediately afterward, to remain so until he has something else to put into them!

The best business men always recognize fully the maxim of something for something. So do all great statesmen and society leaders—in fact, all successful people do. It is at the basis of their success and popularity. For if one have all the other good qualities and be utterly selfish, he will never really and truly succeed. His contemporaries find him out and send him down to posterity with his character pinned to his back.

So, if you have a tendency to be greedy, to get your cake as alms, rather than as the rightful return for the legal-tender of labor of some sort that shall benefit the world, and want to go into a corner to eat it all by yourself, try to get the better of that inclination. It will help you to do so to study for a little while the movements of the wheels within the wheels of the machinery of daily life—to

note how one thing depends upon another—how no man, who is a whole man, really lives to himself—how life is not a game of grab, but of giving and taking, and bury your shallow philosophy of selfishness away forever, so deep that you will forget that it was ever yours.

